



Water Study

1) Address comments below and throughout for the Final BOD

2) A water service line up to the meter must be within a dedicated water line easement of minimum width (16ft w/o sewer 20ft w/ sewer) or within the City ROW. If the existing PUE between Galleria and the proposed development is to be abandoned the existing Galleria water meter cannot remain in its current location. If the PUE is not to be abandoned the PUE must meet the minimum width requirements or the water meter must be relocated.

3) There is no clear utility plan showing the domestic water meter and building connection and separation from the Galleria....please clarify.

4) Include statement that any private water lines will conform to all applicable code.

5.) No approval is implied regarding proposed easement abandonments shown or discussed within this report. Follow the City process and requirements for abandoning a public utility easement and converting it to a private easement (refer to following page)

6) Updated hydrant flow tests must be performed (2 total). Refer to comments in relevant section herein.

7) Include a legible utility plan for Final BOD (not a CAD drawing)

PRELIMINARY WATER BASIS OF DESIGN REPORT FOR MARQUEE

PREPARED FOR

Davis
74 E Real Salado Parkw
Tempe, AZ 85281

PREPARED BY

Vicente Ruiz, P.E.
DAVID EVANS & ASSOCIATES, INC.
4600 E WASHINGTON STREET, SUITE 250
PHOENIX, AZ 85034
(602) 678-5151

JULY, 2018

DEA PROJECT NO. DVSX-0002

PRELIMINARY Basis of Design Report

- ACCEPTED
 ACCEPTED AS NOTED
 REVISE AND RESUBMIT



Disclaimer: If accepted; the preliminary approval is granted under the condition that a final basis of design report will also be submitted for city review and approval (typically during the DR or PP case). The final report shall incorporate further water or sewer design and analysis requirements as defined in the city design standards and policy manual and address those items noted in the preliminary review comments (both separate and included herein). The final report shall be submitted and approved prior to the plan review submission.
For questions or clarifications contact the Water Resources Planning and Engineering Department at 480-312-5685.

BY Idillon

DATE 8/14/2018



LDillon added page 8/14/18

**DRAFT PROCESS FOR ABANDONING A PUBLIC WATER/SEWER LINE EASEMENT AND
REPLACING IT WITH A PRIVATE EASEMENT***

*Confirm with city Right of Way Management Department/Staff on final specifics

1. Provide a letter from initiating party stating specific abandonment intent with related figure(s). Refer to DS&PM Ch6 and Ch7 easement abandonment figure requirements. Include/list all applicable standards governing the proposed private infrastructure and include a statement of current or intended conformance.
2. City checks acceptability of abandonment and responds to proceed (or not proceed).
3. The initiating party shall provide the City with a signed and dated letter originating from any/all served or impacted property owners or representatives that share the use of the impacted infrastructure stating that they agree to take on ownership of the sewer and release the City of any/all current or future responsibility. Letter would need to include a specific reference to the private agreement already finalized/executed that meets any/all conventional legal requirements.
4. Abandonment acceptance letter issued from Water Resources and other applicable utilities (or denial of request). Any conditions shall be listed.
5. If abandonment is accepted by all:
 - a. Dedication (recording) of new private easement as previously detailed.
 - b. Construction or modification of new infrastructure (if applicable)
 - c. Submit easement abandonment application with other required items for City processing
 - c. Abandonment of City easement issued/recorded

Dillon, Levi

From: Vicente Ruiz <Vrr@deainc.com>
Sent: Tuesday, August 14, 2018 3:21 PM
To: Dillon, Levi; Hayes, Eliana
Cc: Ramzi Georges; Boyce O'Brien (bobrien@stockdalecapital.com)
Subject: RE: Marquee PUE location
Attachments: Marquee CONCEPT UTIL-Layout1.pdf

Categories: Call

Thanks Levi, I provided responses to your questions below. Hope this clears up some concerns, but it seems we are leaning back to our original intent to make the water and sewer lines private. The owners main goal is to maintain the Galleria services in operation at all times, so we are attempting to create as little disruption as possible to their services, while still respecting design requirements and understanding future maintenance issues.

Vince

From: Dillon, Levi [mailto:LDillon@Scottsdaleaz.gov]
Sent: Monday, August 13, 2018 6:30 PM
To: Vicente Ruiz <Vrr@deainc.com>; Hayes, Eliana <EHayes@Scottsdaleaz.gov>
Cc: Ramzi Georges <Ryg@deainc.com>
Subject: RE: Marquee PUE location

Hi Vicente, I have questions on the sewer BOD. Note I am currently reviewing both water and sewerBODs:

1. By re-zoning effectively everything must be brought up to code. The City cannot accept an 8-foot sewer and water line easement. How will we access for repair or replacement? We understand that maintenance will be the issue, so this leads us to make this water and sewer service private. We could explore relocating the Galleria water service to Shoeman and coming south through the trash pickup drive to avoid the sewer parallel in the PUE. Would this ease the sewer easement width? We have 11 feet between the existing wall and the Marquee.
2. AAC/IPC compliant sewer i.e. private sewer, has basically the same requirements for this sewer line as the City, including with regard to offset from building (6 feet clearance minimum). How will either be satisfied with what you have proposed? It is my understanding that the separation requirements are in place to avoid potential loading from the structures and their footings, however, in this case, the building garage and wall footings extend down below the sewer location. The IPC states the building water and sewer can be in the same trench provided the water is 12 inch above the sewer, or else it has 5 foot separation.
3. Are you proposing to replace the 8" VCP line with new PVC mounted to support brackets w/clamps? Assuming it is private now, this is an option made by the structural engineer in order to be able to build the new Marquee garage. This could be made temporary only for during construction.
 - a. This would be very a-typical. Would the City then taking on responsibility of the mechanical attachment, support attachment to the building, or any issue with the support-building interface? Offset from building is intended to protect building foundations, are we then taking on this structural liability with non-conforming line? I expect structural will be willing to provide calculations for restraints, and we will assume these lines can be private therefore maintenance and protection will be owners responsibility. If there need to be waivers for the city then please let us know.
4. What are you proposing will be done about the sewer and stormwater manholes in the new cross section you provided? The storm drain will also need to be private as it is taking roof drain runoff from the Galleria and the Marquee, and a cross drainage agreement will be made for the two lots. Again, the same owner makes it easy now.

5. Are these two building really going to be allowed to have almost zero setback between them? **About 11 feet as currently designed.**
6. Regarding the sewer that is aligned north-south that is shown to be removed:
 - a. This serves the Galleria, where will this flow be re-routed? **The engineer of the previously approved BOD for this site stated in the report that they verified that the Galleria service connects to the main that goes west and south, and not into the north line.**

Please respond ASAP. Thank you.

Levi C. Dillon, P.E. | Sr. Water Resources Engineer



"Water Sustainability through
Stewardship, Innovation and People"

Contact Info

Direct: (480) 312-5319
Main office: (480) 312-5685

Fax: (480) 312-5615

Mailing/Office Address

Water Resources Administration
9379 E. San Salvador Dr.
Scottsdale, AZ. 85258

Sending me an attachment over 5MB? Please use the link below:

<https://securemail.scottsdaleaz.gov/dropbox/lidillon@scottsdaleaz.gov>

From: Vicente Ruiz <vrr@deainc.com>

Sent: Monday, August 13, 2018 12:05 PM

To: Hayes, Eliana <EHayes@Scottsdaleaz.gov>; Dillon, Levi <Ldillon@Scottsdaleaz.gov>

Cc: Ramzi Georges <Ryg@deainc.com>

Subject: Marquee PUE location

Eliana, Levi,

Hope you had a great weekend. Here is a cross section of the latest proposed garage and building extent between the Marquee Office and the existing Galleria retaining wall. The intent is to keep the 8ft PUE in place, and, during construction of the Marquee, restrain it to protect in place. We will no longer propose underground parking beneath the PUE, and we will no longer look to relocate the existing water main and meter serving the Galleria. Let me know your thoughts on this approach. I appreciate your early coordination on this.

Thanks,

Vicente Ruiz | Project Manager, Land Development

David Evans and Associates, Inc.

4600 E Washington St Suite 250 | Phoenix, AZ, 85034 | www.deainc.com

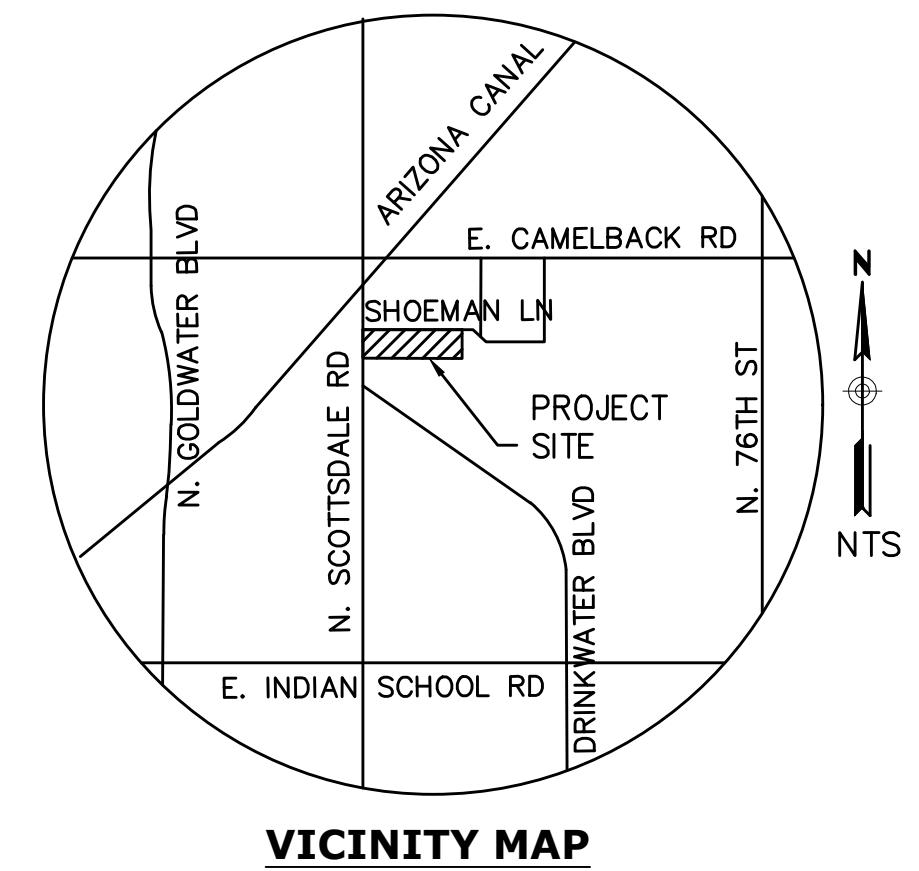
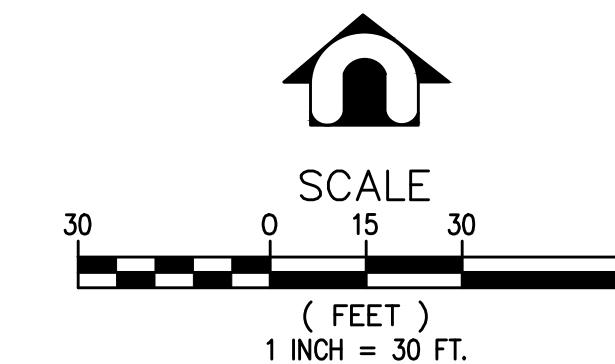
d: 602.674.2001 | c: 602.214.7191 | cisco: 490001 | vrr@deainc.com

ENERGY | LAND DEVELOPMENT | MARINE SERVICES | SURVEYING AND GEOMATICS | TRANSPORTATION | WATER AND ENVIRONMENT

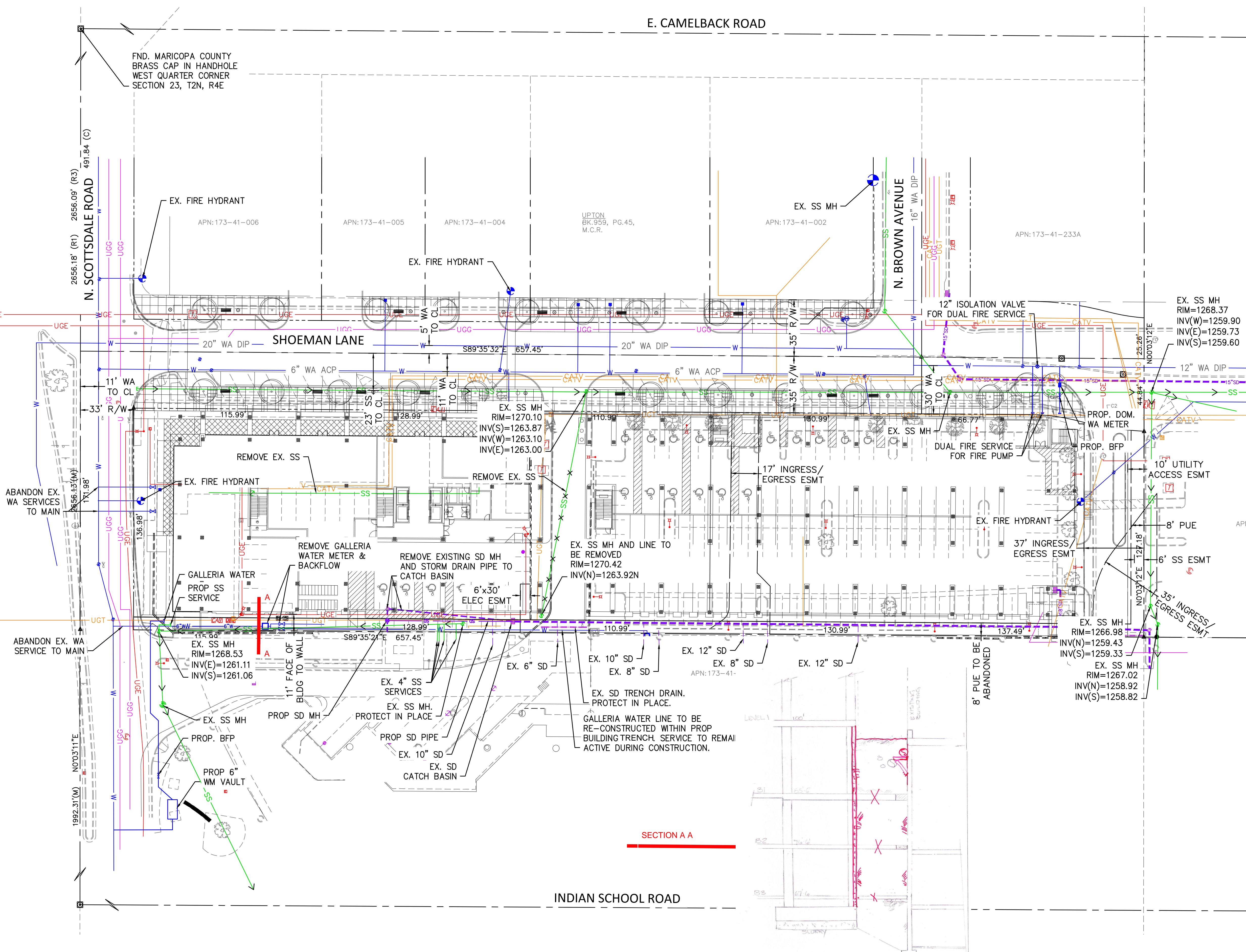
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Subject: RE: Marquee PUE location
Attachments: Marquee CONCEPT UTIL-Layout1.pdf
Categories: Call

CONCEPTUAL UTILITY PLAN FOR MARQUEE CITY OF SCOTTSDALE, ARIZONA

LOCATED IN THE NORTHWEST QUARTER OF SECTION 23, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY ARIZONA



VICINITY MAP



DEVELOPER/OWNER

STOCKDALE CAPITAL PARTNERS
4343 N. SCOTTSDALE ROAD, STE. 180
SCOTTSDALE, AZ 85251
CONTACT: BOYCE O'BRIEN
PHONE: (602) 748-8888

ARCHITECT

DAVIS ARCHITECTURE
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PHONE: (602) 448-1994

ENGINEER

DAVID EVANS AND ASSOCIATES, INC.
4600 EAST WASHINGTON STREET,
SUITE 250
PHOENIX, AZ 85034
CONTACT: VICENTE RUIZ
PHONE: (602) 474-9001

BENCHMARK

THE INTERSECTION OF CAMELBACK ROAD AND MILLER ROAD, A STONE IN A HANDHOLE, DOWN 1.45'. CITY OF SCOTTSDALE GPS POINT 4234, ELEV=1259.425, NAVD '88 DATUM.

BASIS OF BEARING

BASIS OF BEARING FOR THIS SURVEY IS A BEARING OF NORTH 89°34'30" WEST, ALONG THE NORTH LINE OF THE SOUTHWEST QUARTER OF SECTION 23, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, ACCORDING TO THE PLAT OF CAMELBACK PARK PLAZA, AS RECORDED IN BOOK 86, PAGE 13, MARICOPA COUNTY RECORDS, ARIZONA.

LEGAL DESCRIPTION

PARCEL NO. 1:
LOTS 6 AND 7, SHOEMAN TRACT, ACCORDING TO BOOK 42 OF MAPS, PAGE 31, RECORDS OF MARICOPA COUNTY, ARIZONA.

PARCEL NO. 2:

LOTS 8, 9 AND 10, SHOEMAN TRACT, ACCORDING TO THE PLAT OF RECORD IN THE OFFICE OF THE COUNTY RECORDED OF MARICOPA COUNTY, ARIZONA, IN BOOK 42 OF MAPS, PAGE 31.

CONCEPTUAL UTILITY PLAN FOR MARQUEE

4419 N. SCOTTSDALE RD
SCOTTSDALE, ARIZONA

SECTION: 23
TWNSHP: 2N
RANGE: 4E

JOB NO.: KHF6007

SHEET OF 1



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EXHIBITS

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TITLE

Vicinity Map
Conceptual Water and Sewer Plan

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TITLE

City of Scottsdale Water Quarter Section Map
Exhibits
Water Demand Table
WaterCad Modeling
Fire Flow Results



A. INTRODUCTION

This basis of design report was completed under a contract with Davis for Stockdale Capital Partners, LLC, owner and developer of the Marquee. The proposed Marquee project is a multi-story office building above a single ground level retail space. An onsite parking garage is also proposed as part of this project. The site was originally approved for zoning under number 7-ZN-2015. The Preliminary Water Basis of Design Report was prepared by Hunter Engineering and was approved with comments by Doug Mann in August 2015. This new rezoning submittal will address the increased office space floors which has increased the water demand from the site.

1. Project Location

The proposed Marquee project is located at the southeast corner of Shoeman Lane and Scottsdale Road within the City of Scottsdale, Arizona. The location of the site is illustrated in project's vicinity map Exhibit 1 in Appendix B.

2. Site Zoning

The zoning of the Marquee site is discussed in Section C.1 of this report.

3. General Plan

The Marquee project is located within what is considered the Downtown Core Area of the City of Scottsdale General Plan and it will reflect the plan's vision, goals, and policies.

B. DESIGN DOCUMENTATION

1. Design Procedures

The analysis of the proposed water system will be done in compliance with the City of Scottsdale Design Standards and Policies Manual, 2017.

The proposed water distribution system will serve the project in accordance with City of Scottsdale design standards and the ADEQ Engineering Bulletin 10.

The estimated Average Day Demand of the Marquee project was determined based on the following Average Day Demand values. All of the values below include both inside use and outside use demands.

- Office = 0.6 gallons per square foot
- Retail = 0.8 gallons per square foot

original report uses
24hrs, 12 hr correct
for 2018 DS&PM

The Maximum Day Demand was calculated using a factor of 2.0 times the Average Day Demand using gpm assuming a **12 hour daily demand**. The Peak Hour Demand was determined by multiplying the Average Day Demand by a factor of 3.5.

2. Software

Water demands were determined using a Microsoft Excel spreadsheet. DEA created a WaterCAD™ model of the proposed water system. WaterCAD is a water distribution system modeling software created by Bentley. To run WaterCAD, a user inputs the water system map, waterline sizes, and demand locations. WaterCAD connects these elements as a system and uses mathematical equations to determine flow directions, flow magnitudes and pressures for the water system modeled.

C. EXISTING CONDITIONS

1. Zoning and Land Use

The site is currently zoned C2-DO, and is proposed to be C3-DO. This district is intended to provide for commercial use in the Downton district.

2. Existing Topography, Vegetation, and Landform Features

Generally, the existing topography slopes in a southeasterly direction. The site is currently a 2-story retail building and a single-story retail building with surface parking and minimal site landscaping.

3. Existing Utilities

There is an existing 6" ACP main and a 20" DIP main in Shoeman Lane from Scottsdale Road to North Brown Road and a 12" DIP main from Brown Avenue to the east property line. There is also an existing 8" CIP Main in Scottsdale Road. There are two existing fire hydrants on-site. One is located on Scottsdale Road near the middle of the site and one is located at the northeast corner of the site. The site currently has 2 domestic water meters, one off of the Scottsdale Road 8" main, and the other off the 6" main in Shoeman Lane. Water meter sizes will be verified in the final report.

The existing onsite demands are summarized below.

verify and apply for
development fee
credit

State source or how
determined..update :
in appendix

TABLE C.3.1 – PREVIOUS WATER DEMAND SUMMARY

| Average Day (gpm) | Max Day (gpm) | Peak Hour (gpm) |
|----------------------|------------------|--------------------|
| 19.76 | 39.5 | 69.2 |

The existing building to the south is the Galleria Corporate Center and is constructed adjacent to the project site's south property line. The existing water service for the Galleria is taken off Scottsdale Road and routed through the project site at the southwest corner. The existing service, meter and backflow are located within an existing 8' PUE and extend approximately 320 lf from Scottsdale Road where it enters the Galleria building. The utility connections for the Galleria will remain in place, see the Proposed Conditions section for details.

Fire flow test must be
updated/repeated...more than 1 year
old

5. Certified Flow Testing

A Fire flow test was done for this project on fire hydrants adjacent to the project site. The fire flow test from the previously approved BOD is attached in the appendix. The office building has an area of 278,015 sf. Based on the 2015 International Fire Code, an 8,000 gpm fire flow is required. Per the City of Scottsdale standards regarding an automatic sprinkler system, a fire flow reduction of 75% is implemented, resulting in a fire flow demand of 2,000 gpm.

D. PROPOSED CONDITIONS

1. Site Plan

This building is a high-rise per IBC, this requires a minimum of 2,500gpm fire flow per DS&PM 6-1.501

The proposed site improvements are illustrated on Exhibit 2 in Appendix B. This plan assumes the existing buildings onsite and the existing parking lot are cleared prior to construction.

For the final BOD an additional fire flow modeling scenario with the 12-inch valve closed at Brown and Shoeman must be completed (20" and 16" supply not available). A new fire flow test with the 12" valve closed must be completed. The pressure and flow hydrants shall be to the east of Brown and Shoeman intersection. This flow test must be coordinated with City Water Operations, inspection services, and local establishments if necessary. The purpose is to verify the validity/capacity of the dual fire service valving being proposed.

12" line confirmed
2007 as-built 84246,
page 3

Is the 6-inch meter intended to feed the Galleria and this new property??...no utility plan is included with this report and it is not clear from the utility plan included in the sewer BOD. Please clarify.

2. Proposed Connections

New domestic water service connections are proposed for this project. The existing services will be abandoned from the main. The anticipated location for the domestic service and the fire lines is off of the 12" water main in Shoeman Lane. This location is chosen because it is connected to a 20" and a 6" main to the west, a 16" main to the north in Brown Avenue, and a 6" to the east in Buckboard Trail.

Initial service line and meter sizing is per DS&PM, ultimate sizing is per IPC fixture count with safety factor

The service sizes will be based on the requirements provided by the project's Mechanical Engineer. The current estimate is a 6" water service with meter vaults supplying the office portion of the site. There may be a 2 inch meter separate for the retail portion.

The fire riser room will have two 6" fire lines coming off of the 12" water main in Shoeman Lane. These services will be separated by a valve per City of Scottsdale requirements. The fire lines will connect to a fire pump designed with the fire protection submittal.

Refer to the Concept Water and Sewer Plan Exhibit 2 to see how the proposed water main and the existing water main connect.

There will be one proposed 1" landscape meter located on Shoeman Lane off of the 6" main.

Use lowest fire department access level as reference for high-rise determination

3. Water Zone, Fire Flow, and System Pressures

The Marquee development lies within the City of Scottsdale Water Zone 1-A per the *2015 Water Master Plan Update* prepared by CH2M Hill. This zone serves areas with ground elevations from 1250 feet to 1330 feet. The finished floor (FF) elevations of the first level of the building are at 1272.50'. The FF elevation of the top story of the building is anticipated to be at 103.16' above 1st floor FF.

IBC high-rise designation >75ft above lowest fire access level, this is a high-rise

The static pressure modeled is based on the flow test performed. High static pressure requires PRVs to be installed at water meter service locations. The results of the flow tests are included in Appendix E. The guidelines provided in the City of Scottsdale DSPM were followed for the flow test pressure and flow results. Static pressure was reduced from 102 psi to 72 psi, and flow rates were reduced by 10%. The residual was reduced from 99 psi to 72 psi. show as modeling scenario 4 in final BOD

Due to the height of the buildings, private booster pumps will be required to supply water to the upper floors to maintain a minimum residual pressure of 50 psi at the highest finished floor level, under normal operating conditions. The height is 103.16' to the highest finished floor. The ground floor is at 1272.50 and the top finished floor is at 1375.66'. This building is considered a high rise and will follow IFC 2015 requirements. The building system will maintain a minimum pressure of 15 psi under fire flow conditions.

Buildings on site will be sprinkled including the parking garage.

E. COMPUTATIONS

1. Calculations

A hard copy of the demand calculations for this report has been provided in Appendix C.

2. Demand Summary

Table E.2.1 summarizes the water demands for the Marquee project. A detailed demand table is provided in Appendix C. The total demand for the project is summarized below.

TABLE E.2.1 – TOTAL WATER DEMAND SUMMARY

| Average Day (gpm) | Max Day (gpm) | Peak Hour (gpm) |
|----------------------|------------------|--------------------|
| 236.2 | 472.3 | 826.6 |

flows based on square footages, ultimate service and meter sizing should be based on fixture analysis with safety factor

3. Water Modeling Results

Average Day, Max Day + FF, and Peak Hour demand scenarios were analyzed for the project. Demands were allocated to a junction at the proposed service lines location, and added at the elevation of the highest finished floor. Fire flows were assigned at the junction of the proposed fireline connections. The pump and reservoir were used to model the flow test results and the required reductions in flow in pressures. Due to the large pipe sizes connected to the 12" water main in Shoeman Lane that will service the site, it seems reasonable to apply the available flow and pressure to both ends of the existing 12" main. Full results of the analysis are included in Appendix D.

provide summary of results here, no information provided



No offsite demands were included in the analysis.

existing off-site flows are included in pump curve based on hydrant test results correct? confirm this then state

F. SUMMARY

The proposed Marquee water system connections are illustrated on Exhibit 2, Appendix A. The existing water meter services on the site will be abandoned at the main, and new domestic and fire services will be installed on the 12" main in Shoeman Lane. The site has existing fire

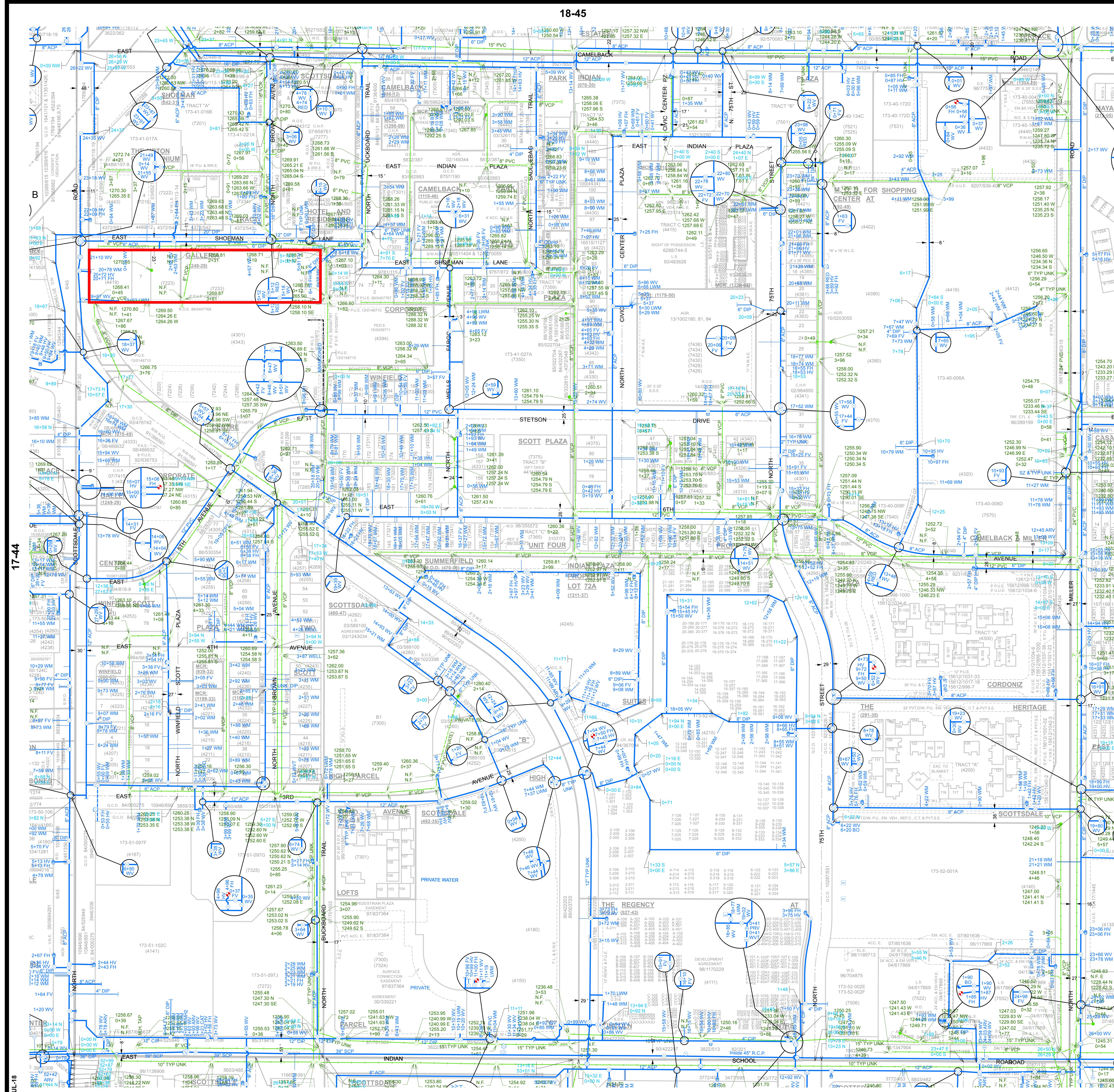
hydrants on the west and east sides of the site. The water meter service for the Galleria will be relocated and installed within the Scottsdale Road right of way and routed in a private easement on the project site to the existing building service entrance locations.

The existing water infrastructure meets City of Scottsdale pressure, velocity, and headloss requirements for average day, max day plus fire flow, and peak hour scenarios based on the 2017 City of Scottsdale DSPM.

All proposed improvements are at developers cost. There will not be a City reimbursable agreement.

APPENDIX A
CITY OF SCOTTSDALE WATER QUARTER SECTION MAP

17-44



18-45

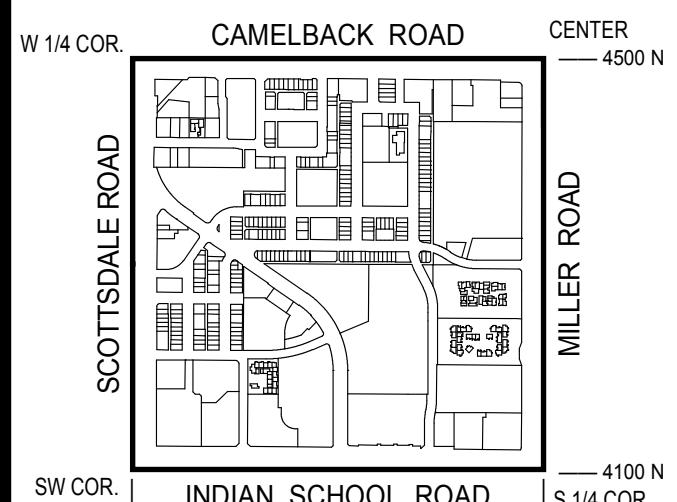
16-45

GENERAL NOTES:
1. THIS IS A COMPUTER GENERATED DRAWING. FOR ANY REVISIONS PLEASE CONTACT THE CITY OF SCOTTSDALE GIS DEPARTMENT AT (480) 312-7792.
2. THE SECTION LINE BEARING AND DISTANCES ARE BASED ON THE CITY OF SCOTTSDALE GPS SURVEY OF SEPTEMBER, 1991. BEARINGS ARE NAD 83 GRID AND DISTANCES ARE FLATTENED TO GROUND, WHERE NO CORNER WAS FOUND THE DIMENSIONS ARE GIVEN TO CALCULATED SECTION CORNERS AND ARE NOTED AS CALCULATED ON THE MAP.

LEGEND:

- Water Valve
- Non-potable Water Valve
- Fire Hydrant
- Water Blowoff
- Water Main Reducer
- Water Sample Station
- Water Air Release Valve
- Non-potable Water Air Release Valve
- Water Pressure Reducing Valve
- Water Vault
- Water Manhole
- Non-Potable Water Manhole
- Water Pump
- Water Main
- Non-Potable Water Main
- Fire Line
- Water Service
- Non-Scottsdale Water Main
- Sewer Manhole
- Sewer Cleanout
- Sewer Lift Station
- Sewer Treatment Plant
- Sewer Main - Gravity
- Sewer Main - Force
- Non-Scottsdale Sewer Main
- Sewer Service

VICINITY MAP



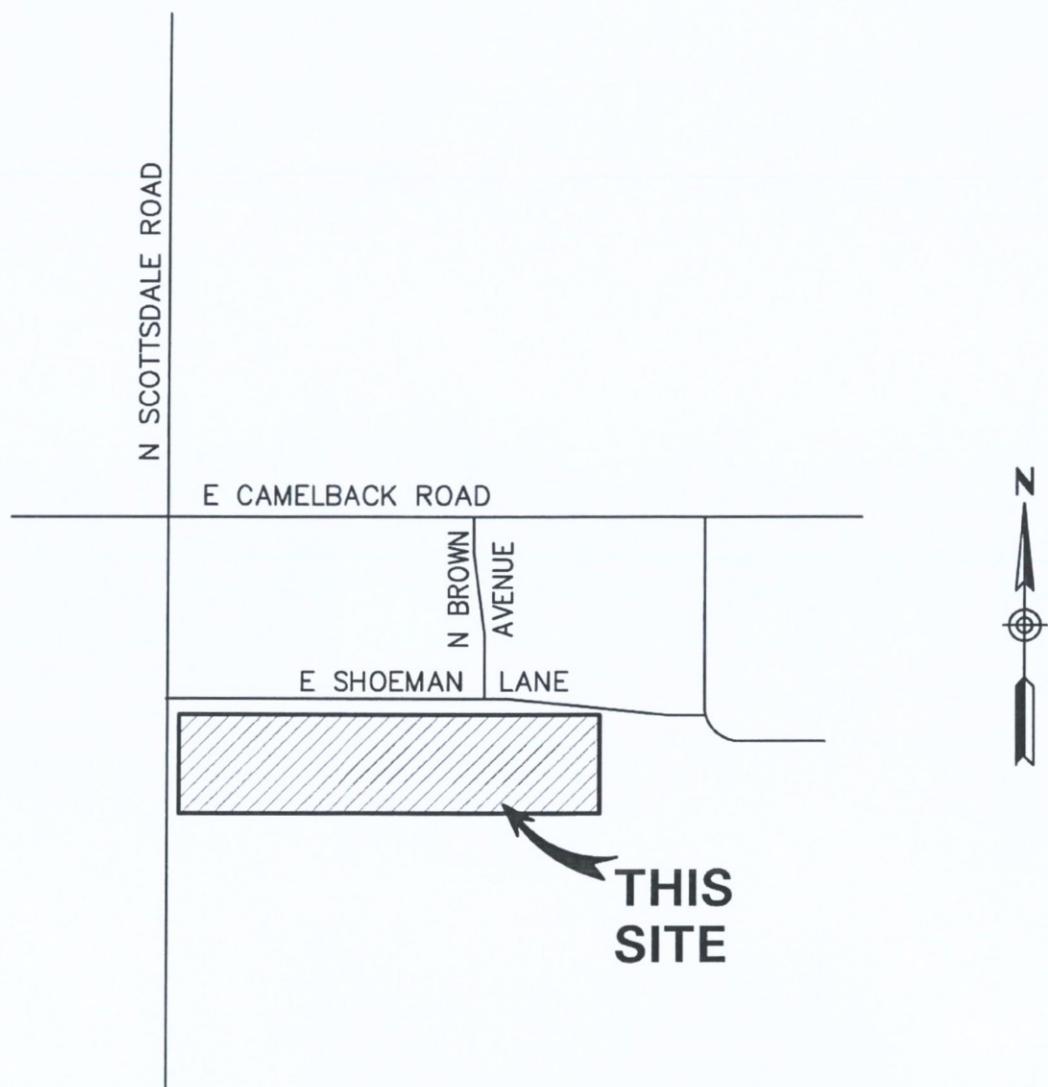
SCALE: 1" = 100'
0 50 100 200
The map scale of 1" = 100' is based on a full size print of 30" x 36"

WATER & SEWER QUARTER SECTION MAP

17-45

SW 1/4 SEC. 23 T2N R4E

APPENDIX B EXHIBITS



VICINITY MAP
FIGURE 1

APPENDIX C WATER DEMAND TABLE

Marquee
Existing Water Demand

| Type | Land Use and Description | Area Sq. Ft. | Max Units (DU, SF, Acres) | Persons Per Unit | Pop. | Average Daily Demand Per Unit (gpm) | Average Daily Demand (gpm)  | Max. Day Factor | Maximum Daily Demand (gpm) | Peak Hour Factor | Peak Hour Demand (gpm) | Fire Flow Demand (gpm) | Fire Flow Reduction (gpm) |
|---------------|--------------------------|--------------|---------------------------|------------------|------|-------------------------------------|---|-----------------|----------------------------|------------------|------------------------|------------------------|---------------------------|
| | Commercial-retail | 16,376 | | | | 0.00111 | 18.18 | 2.00 | 36.4 | 3.50 | 63.6 | 1,500 | 1,500 |
| | Commercial-office | 1,900 | | | | 0.000834 | 1.58 | 2.00 | 3.2 | 3.50 | 5.5 | 1,500 | 1,500 |
| TOTALS | | | | | | | 19.76 | | 39.5 | | 69.2 | | |

Note: The dwelling units and square footage was based on latest available site plans. Assumed fire flow reduction of 75% with sprinkler system, min 1,500gpm.

Marquee
Water Demand

| Type | Land Use and Description | Area Sq. Ft. | Max Units (DU, SF, Acres) | Persons Per Unit | Pop. | Average Daily Demand Per Unit (gpd) ✓ | Average Daily Demand (gpm) | Max. Day Factor | Maximum Daily Demand (gpm) | Peak Hour Factor | Peak Hour Demand (gpm) | Fire Flow Demand (gpm) | Fire Flow Reduction (gpm) |
|------|--------------------------|--------------|---------------------------|------------------|------|---------------------------------------|----------------------------|-----------------|----------------------------|------------------|------------------------|------------------------|---------------------------|
| | Commercial-retail | 15,600 | | | | 0.00111 | 17.32 | 2.00 | 34.6 | 3.50 | 60.6 | 8,000 | 2,000 |
| | Commercial-office | 262,415 | | | | 0.000834 | 218.85 | 2.00 | 437.7 | 3.50 | 766.0 | 8,000 | 2,000 |

TOTALS

Note: The square footage was based on latest available site plan. Assumed fire flow reduction of 75% with sprinkler system.

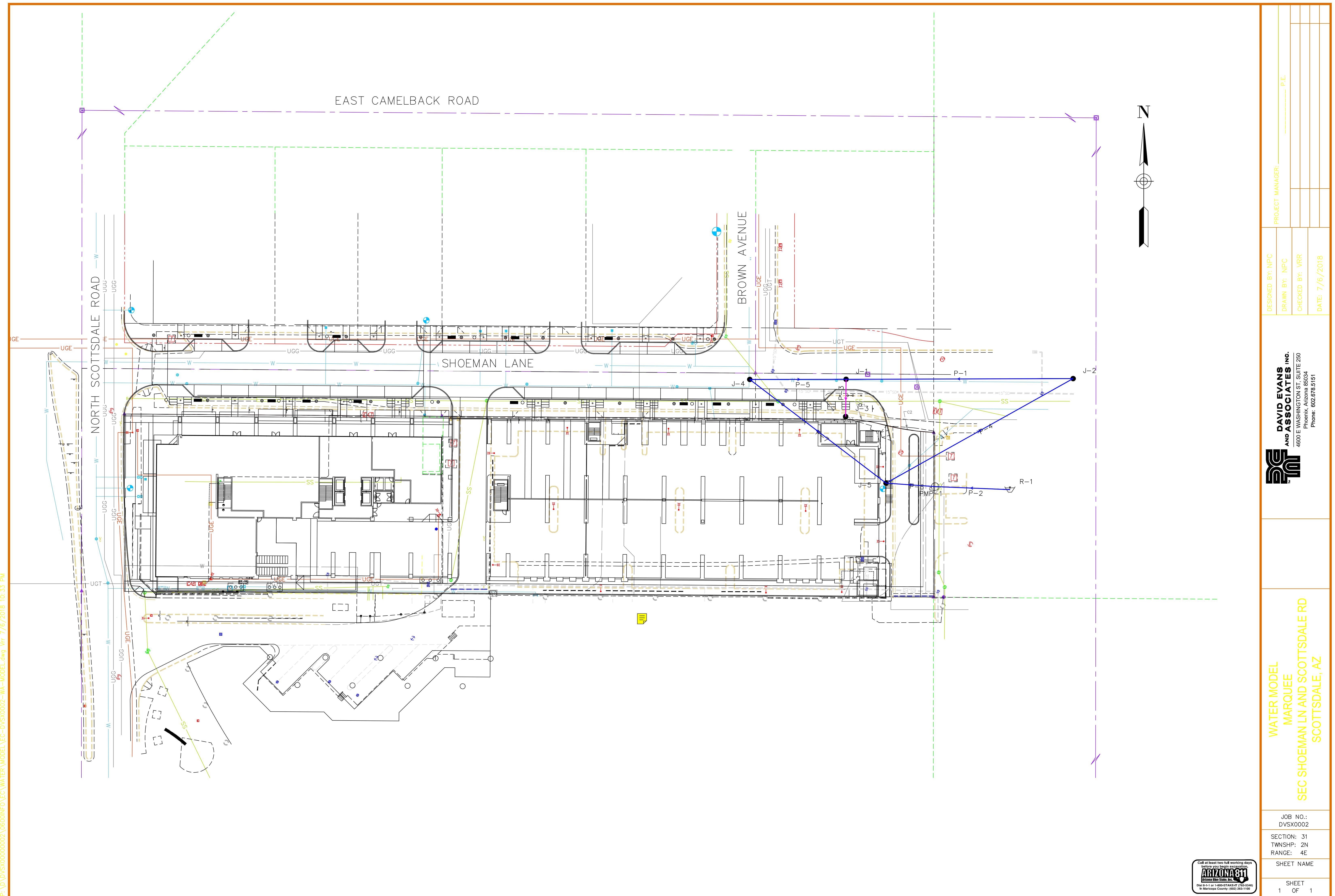
236.17**472.3****826.6**

2,500gpm min for
high-rise



APPENDIX D

WATERCAD MODELING RESULTS



Pump Definition Detailed Report: REDUCED FIRE FLOW 10/2015

Element Details

| | | |
|-------|---------------------------------|-------|
| ID | 55 | Notes |
| Label | REDUCED FIRE FLOW 10/2015 | |

Pump Definition Type

| | | | |
|----------------------|--------------------|------------------------|-----------|
| Pump Definition Type | Standard (3 Point) | Design Head | 166.00 ft |
| Shutoff Flow | 0 gpm | Maximum Operating Flow | 7,540 gpm |
| Shutoff Head | 166.32 ft | Maximum Operating Head | 46.20 ft |
| Design Flow | 1,264 gpm | | |

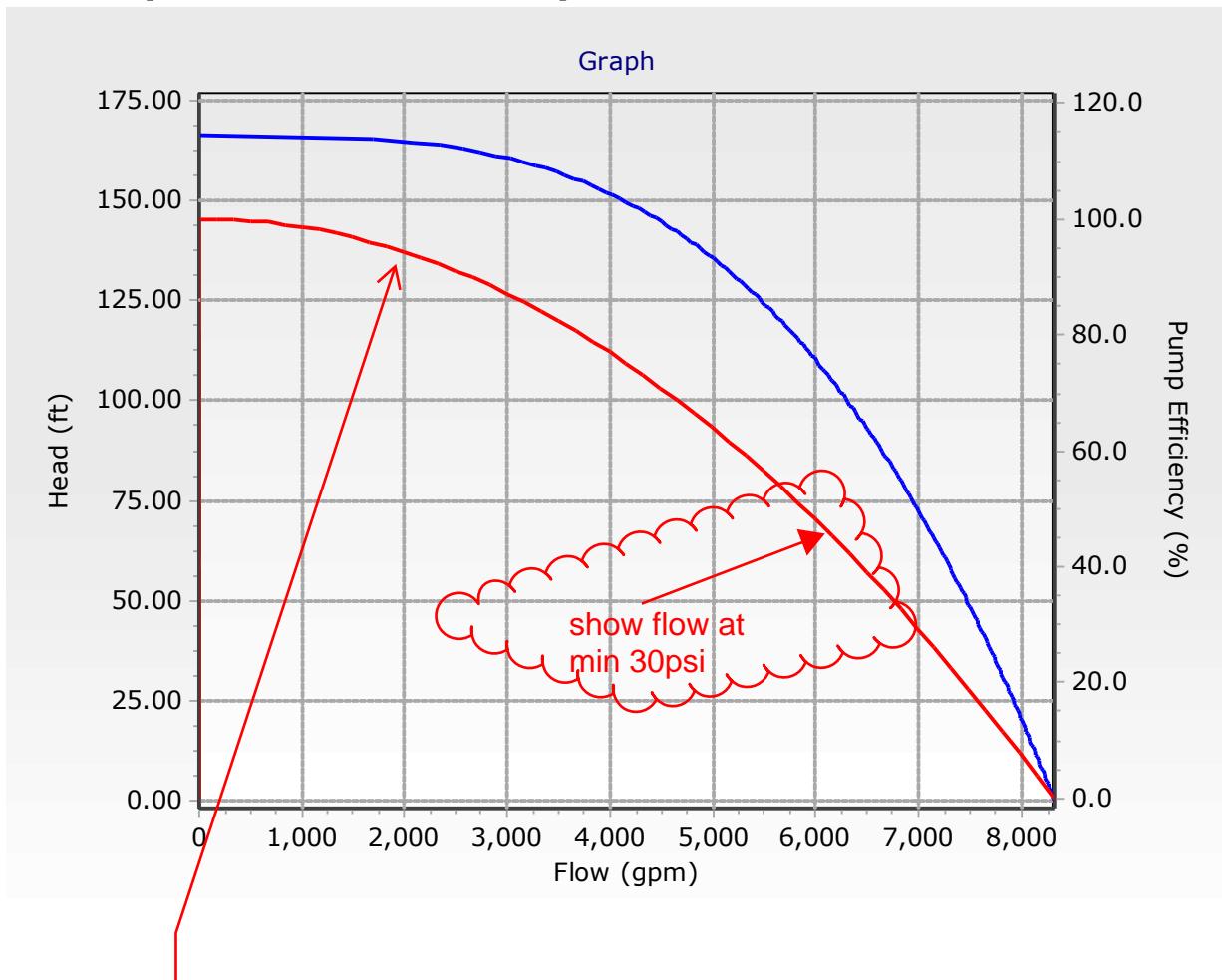
Pump Efficiency Type

| | | | |
|----------------------|-----------------------|--------------------------|---------|
| Pump Efficiency Type | Best Efficiency Point | Motor Efficiency | 100.0 % |
| BEP Efficiency | 100.0 % | Is Variable Speed Drive? | False |
| BEP Flow | 0 gpm | | |

Transient (Physical)

| | | | |
|--------------------------|--------------------------|-----------------------|-------------------|
| Inertia (Pump and Motor) | 0.000 lb·ft ² | Specific Speed | SI=25, US=1280 |
| Speed (Full) | 0 rpm | Reverse Spin Allowed? | True |

Pump Definition Detailed Report: REDUCED FIRE FLOW 10/2015



Indicate which supply
curve is used in
modeling

AVERAGE DAY

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|-------|-------------------|-----------------|-------------------------|-------------------|
| J-2 | 0.00 | 0 | 166.32 | 72 |
| J-1 | 0.00 | 0 | 166.32 | 72 |
| J-3 | 103.16 | 236 | 164.33 | 26 |
| J-4 | 0.00 | 0 | 166.32 | 72 |
| J-5 | 0.00 | 0 | 166.32 | 72 |

AVERAGE DAY

FlexTable: Pipe Table

| Label | Length (User Defined) (ft) | Length (Scaled) (ft) | Start Node | Stop Node | Diameter (in) | Hazen-Williams C | Minor Loss Coefficient (Local) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|----------------------------|----------------------|------------|-----------|---------------|------------------|--------------------------------|------------|-----------------|---------------------------|
| P-1 | 0 | 175 | J-2 | J-1 | 12.0 | 130.0 | 0.350 | 54 | 0.15 | 0.000 |
| P-2 | 1 | 58 | R-1 | PMP-1 | 12.0 | 130.0 | 0.000 | 236 | 0.67 | 0.000 |
| P-3 | 300 | 29 | J-1 | J-3 | 6.0 | 130.0 | 4.000 | 236 | 2.68 | 0.007 |
| P-4 | 1 | 165 | J-5 | J-2 | 12.0 | 130.0 | 0.000 | 54 | 0.15 | 0.000 |
| P-5 | 0 | 74 | J-4 | J-1 | 12.0 | 130.0 | 0.500 | 182 | 0.52 | 0.005 |
| P-6 | 0 | 38 | PMP-1 | J-5 | 12.0 | 130.0 | 0.000 | 236 | 0.67 | 0.000 |
| P-7 | 0 | 132 | J-5 | J-4 | 12.0 | 130.0 | 0.000 | 182 | 0.52 | 0.000 |

ok this is the hydrant tee but flow to the hydrant is through 50ft of a 6-inch main

MAX DAY PLUS FIRE FLOW

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|-------|-------------------|-----------------|-------------------------|-------------------|
| J-2 | 0.00 | 0 | 163.34 | 71 |
| J-1 | 0.00 | 2,000 | 163.12 | 71 |
| J-3 | 103.16 | 472 | 155.79 | 23 |
| J-4 | 0.00 | 0 | 163.33 | 71 |
| J-5 | 0.00 | 0 | 163.34 | 71 |

pressure at node will change if 2,500gpm is modeled

update to 2,500

MAX DAY PLUS FIRE FLOW

FlexTable: Pipe Table

| Label | Length (User Defined) (ft) | Length (Scaled) (ft) | Start Node | Stop Node | Diameter (in) | Hazen-Williams C | Minor Loss Coefficient (Local) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|----------------------------|----------------------|------------|-----------|---------------|------------------|--------------------------------|------------|-----------------|---------------------------|
| P-1 | 0 | 175 | J-2 | J-1 | 12.0 | 130.0 | 0.350 | 644 | 1.83 | 0.001 |
| P-2 | 1 | 58 | R-1 | PMP-1 | 12.0 | 130.0 | 0.000 | 2,472 | 7.01 | 0.014 |
| P-3 | 300 | 29 | J-1 | J-3 | 6.0 | 130.0 | 4.000 | 472 | 5.36 | 0.024 |
| P-4 | 1 | 165 | J-5 | J-2 | 12.0 | 130.0 | 0.000 | 644 | 1.83 | 0.001 |
| P-5 | 0 | 74 | J-4 | J-1 | 12.0 | 130.0 | 0.500 | 1,828 | 5.19 | 0.475 |
| P-6 | 0 | 38 | PMP-1 | J-5 | 12.0 | 130.0 | 0.000 | 2,472 | 7.01 | 0.014 |
| P-7 | 0 | 132 | J-5 | J-4 | 12.0 | 130.0 | 0.000 | 1,828 | 5.19 | 0.008 |

PEAK HOUR

FlexTable: Junction Table

| Label | Elevation (ft) | Demand (gpm) | Hydraulic Grade (ft) | Pressure (psi) |
|-------|-------------------|-----------------|-------------------------|-------------------|
| J-2 | 0.00 | 0 | 166.24 | 72 |
| J-1 | 0.00 | 0 | 166.21 | 72 |
| J-3 | 103.16 | 827 | 145.11 | 18 |
| J-4 | 0.00 | 0 | 166.24 | 72 |
| J-5 | 0.00 | 0 | 166.24 | 72 |

ok, but no pressure requirement exists in DS&PM for peak hour.

Add scenario for final BOD: Model Scenario 4 from DS&PM, 50psi must be maintained at highest finished floor under normal daily operating flow conditions aka Initial Service Line Design Flow.

For the final BOD an additional fire flow modeling scenario with the 12-inch valve closed at Brown and Shoeman must be completed (20" and 16" supply not available). A new fire flow test with this valve closed must be completed. The pressure and flow hydrants shall be to the east of Brown and Shoeman intersection. This flow test must be coordinated with City Water Operations, inspection services, and local establishments if necessary. The purpose is to verify the validity/capacity of the dual fire service valving being proposed.

PEAK HOUR

FlexTable: Pipe Table

| Label | Length (User Defined) (ft) | Length (Scaled) (ft) | Start Node | Stop Node | Diameter (in) | Hazen-Williams C | Minor Loss Coefficient (Local) | Flow (gpm) | Velocity (ft/s) | Headloss Gradient (ft/ft) |
|-------|----------------------------|----------------------|------------|-----------|---------------|------------------|--------------------------------|------------|-----------------|---------------------------|
| P-1 | 0 | 175 | J-2 | J-1 | 12.0 | 130.0 | 0.350 | 204 | 0.58 | 0.000 |
| P-2 | 1 | 58 | R-1 | PMP-1 | 12.0 | 130.0 | 0.000 | 827 | 2.34 | 0.002 |
| P-3 | 300 | 29 | J-1 | J-3 | 6.0 | 130.0 | 4.000 | 827 | 9.38 | 0.070 |
| P-4 | 1 | 165 | J-5 | J-2 | 12.0 | 130.0 | 0.000 | 204 | 0.58 | 0.000 |
| P-5 | 0 | 74 | J-4 | J-1 | 12.0 | 130.0 | 0.500 | 623 | 1.77 | 0.055 |
| P-6 | 0 | 38 | PMP-1 | J-5 | 12.0 | 130.0 | 0.000 | 827 | 2.34 | 0.002 |
| P-7 | 0 | 132 | J-5 | J-4 | 12.0 | 130.0 | 0.000 | 623 | 1.77 | 0.001 |

APPENDIX E

FIRE FLOW TEST RESULTS



ALLIANCE FIRE PROTECTION CO.

Phone: (480) 966-9178 Fax: (480) 967-9191

2114 East Cedar Street • Tempe, Arizona 85281

E-mail Address: afpc@afpc.com

More than 1 year old, repeat for final
BOD submittal and associated
modeling

AZ Lic. C-16 58130

AZ Lic. L-16 74007

NV Lic. C-41a 30135

FIRE HYDRANT FLOW TEST

Name: Shoeman Lane Building

Scottsdale Rd & Shoeman Lane

Scottsdale, AZ

Date: 07/10/15

Time: 7:30 AM

Report #

Tech: Gus Piombi

Static Hydrant: _____ Flowing Hydrant: _____

Elevation: 0

Dist. Between Hydrants: 400 ft

Diameter of Main:

Static Pressure: 102.0 *HGL 1273*

Residual Pressure: 99.0

Pump Present: NO

Tank Present: NO

Req. GPM: _____

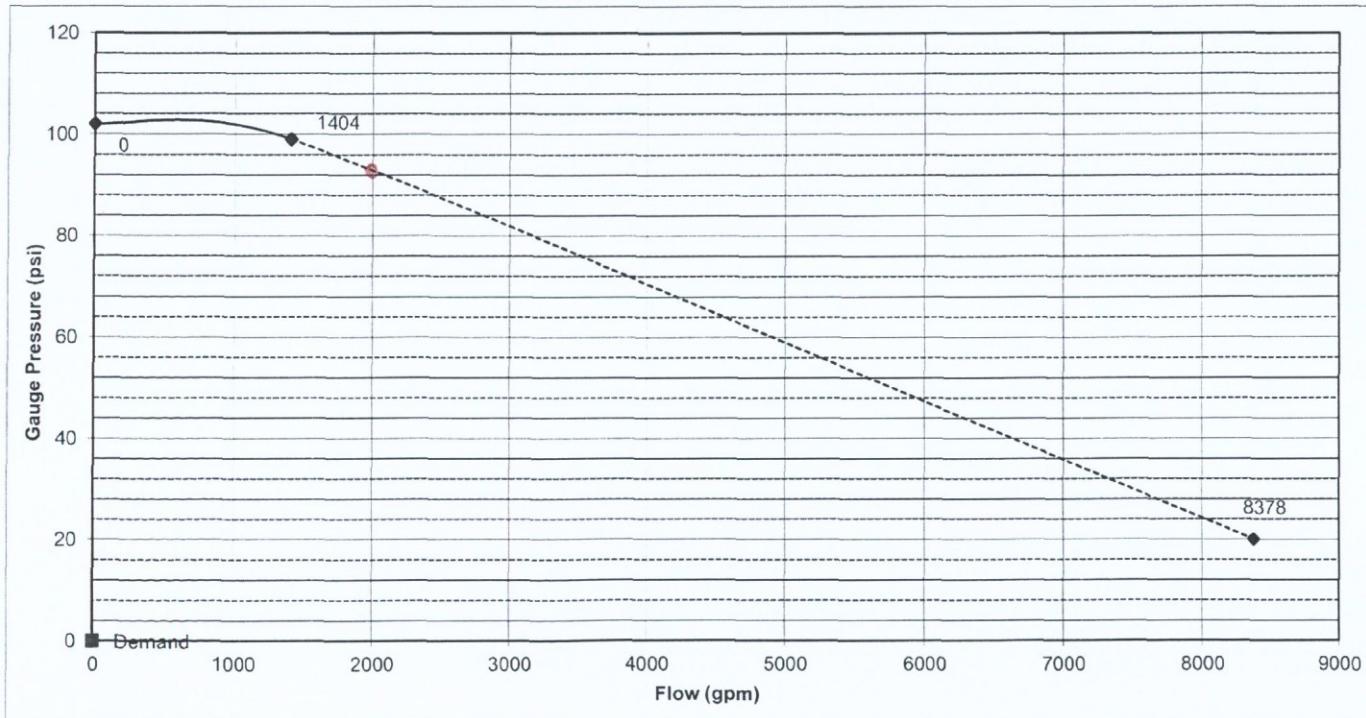
Req. PSI: _____

Elevation: 0

Type of Supply: City Main

| Hydrant: | 1 | 2 | 3 | 4 |
|------------------|-------|---|---|---|
| Outlet Diameter: | 2.5 | | | |
| Pitot Reading: | 70.0 | | | |
| Coeff: | 0.900 | | | |
| Discharge GPM: | 1404 | 0 | 0 | 0 |

| | | | | | |
|----------------------|-----|-----|---|------|-----|
| Static pressure of | 102 | psi | @ | 0 | gpm |
| Residual pressure of | 99 | psi | @ | 1404 | gpm |
| Available flow @ | 20 | psi | @ | 8378 | gpm |



Comments: _____

NOTES:

1. Flowing hydrant is assumed to be on a circulating main or downstream of the pressure test hydrant on a dead-end system.
2. Flow analysis assumes a gravity flow system with no distribution pumps and having no demand, other than the test
3. The distance between hydrants, elevations & main diameters are for information only.



N Scottsdale Rd & E Shoeman Ln

Traffic, Transit, Bicycling

Imagery ©2015 Google, Map data ©2015 Google 50 ft

Both hydrants OFF 6" system
w/ interconnect @ Brown to 20" pipe.

PREVIOUS REPORT FOR REFERENCE

PRELIMINARY BASIS OF DESIGN REPORT
WATER ANALYSIS
FOR
MARQUEE @ THE DISTRICT
SEC SCOTTDALE ROAD AND SHOEMAN LANE
SCOTTSDALE, ARIZONA

PREPARED FOR
LGE Design Build
740 North 52nd Street
Scottsdale, AZ 85008

PREPARED BY

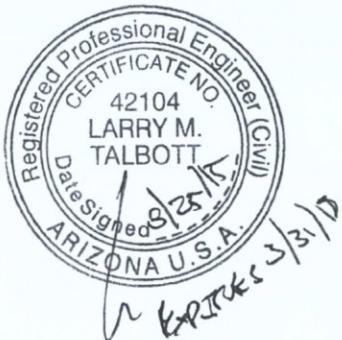
LARRY TALBOTT, P.E.
HUNTER ENGINEERING, INC.
10450 N. 74th Street, SUITE 200
SCOTTSDALE, AZ 85258
(480) 991-3985

H.E. PROJECT NO.: LGEC189

HUNTER
ENGINEERING

TABLE OF CONTENTS

| <u>SECTION</u> | <u>TITLE</u> | <u>LOCATION</u> |
|---------------------|-------------------------------|-----------------|
| 1.0 | Introduction | 1 |
| 2.0 | Existing Conditions | 1 |
| 3.0 | Proposed Water System | 1 |
| 4.0 | Conclusions | 2 |
| 5.0 | References | 2 |
| <u>FIGURES</u> | | |
| 1 | Vicinity Map | Appendix A |
| 2 | Site and Building Information | Appendix A |
| <u>APPENDIX</u> | | |
| A | Figures | |
| B | Calculations | |



1.0 INTRODUCTION

This water report has been prepared for LGE Design Build, developer of the Marquee @ The District project. The purpose of this report is to provide a preliminary water analysis, as required by the City of Scottsdale, to support this development. This report will provide the proposed project demand and discuss potential options for water service. Preparation of this report has been prepared according to the procedures detailed in the City of Scottsdale Wastewater Services Department *Design Standards & Policies Manual, Chapter 6 Water, and January 2010.*

This project is located south of Shoeman Lane east of Scottsdale Road, within the City of Scottsdale, Maricopa County, Arizona. The site is in a portion of Section 23, Township 2 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Figure 1, in Appendix A, illustrates the location of the project site in relation to the City of Scottsdale street system. The proposed access to the site will be provided via Shoeman Lane

The development is for a proposed multi-story office, retail and parking consisting of approximately $2.1 \pm$ acres. Improvements to be made on-site include the proposed multi-story building, parking structure and landscaped areas.

2.0 EXISTING CONDITIONS

There is an existing 6" ACP main and a 20" DIP main in Shoeman Lane from Scottsdale Road to North Brown Road and a 12" DIP main from Brown to the east property line. There is also an existing 8" CIP Main in Scottsdale Road. There are two existing fire hydrants on-site. One is located on Scottsdale Road near the middle of the site and one is located at the northeast corner of the site.

The existing building to the south is the Galleria Corporate Center and is constructed adjacent to the parcels south property line. The Galleria currently has water and sewer service through the project site as well as roof drainage through the projects existing storm drain system. There is also cross access to the service entrance and east building entrance.

The existing water service for the Galleria is taken off of Scottsdale Road and routed through the project site at the southwest corner. The existing service, meter and backflow are located within an existing 8' PUE and extend approximately 320lf from Scottsdale Road where it enters the Galleria building.

3.0 PROPOSED WATER SYSTEM

Domestic, fire and irrigation services will likely be taken from the existing mains in Shoeman Lane. It is anticipated that the domestic, irrigation and fire services will come off either the 12" or 20" mains. No services for the proposed building will be taken off the existing 6" main in Shoeman or the 8" line in Scottsdale Road.

ex. Meter inventory?

The average day demand is calculated based on 0.8 gallons per day per square foot of building for retail and 0.6 gallons per day per square foot of building for office. The maximum day flow is 2.0 times the average day demand, and the peak hour flow is 3.5 times the average day demand. For a summary of the demand calculation see Appendix B. The demand calculations are also tabulated below.

Per the International Fire Code, the highest base fire flow for the building is 8,000 gallons per minute. Because this building will be protected by a sprinkler system per NFPA 13, the required fire flow may be reduced by up to 75% for buildings other than single family residences per 2012 IFC B105.2, but not below 1,500 GPM. The minimum fire flow will be 2,000 GPM @ 20 psi for the site analysis. The system will be modeled at 30 psi to account for backflow preventer assembly losses.

PROJECTED MAXIMUM DOMESTIC WATER DEMANDS

| Building Level | Building Use | Building Area (sf) | Average Day Demands (GPD/sf) | Average Day Demands (GPD) | Average Day Demand (GPM) | Max Day Demand (GPM) | Peak Day Demand (GPM) |
|---------------------|--------------|--------------------|------------------------------|---------------------------|--------------------------|----------------------|-----------------------|
| Ground Level | Retail | 18,950 | 0.8 | 15,160 | 10.53 | 21.06 | 36.85 |
| Level 2 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 3 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 4 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 5 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 6 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 7 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 8 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| | | 274,310 | | 168,376 | 116.93 | 233.86 | 409.25 |

The proposed system was modeled using WaterCad, a pipe network analysis program by Haestad Methods. A reservoir and pump were added to the model near the hydrant test location. The pump curve provided by the city as previously discussed was used for the model. Note that the pipes PX-1 and PX-2 connecting the pumps and reservoirs are not a part of the system and are oversized to 120-inch to minimize system losses. Pipes and junctions were added to the network model matching the pipe sizes, materials and elevations of the proposed and existing system.

The fire flow model was set up with the max day demand and the fire demand for fire flow and peak hour for domestic flow taken from the model node at the northeast corner of the site near the proposed domestic and fire service location. The resultant peak hour pressure just over 100 psi. The resultant fire flow is 5,173 gpm at 30 psi. Both are well over the minimum requirements.

check space reqts

The existing Galleria service, meter and backflow will be removed from project site and relocated to the south along the Galleria frontage. The meter and backflow will be installed in an existing landscape area and the new service will be routed up to the existing service line at the southwest corner of the site and connected to the existing Galleria service line where it will remain in place to the east until it enters the Galleria building at its current location.

- ✓ The existing Galleria service line is located within an 8' PUE. This PUE will be abandoned and a new private easement will be dedicated over the proposed and remaining service location.

4.0 CONCLUSIONS

Based on the results of this study, it can be concluded that:

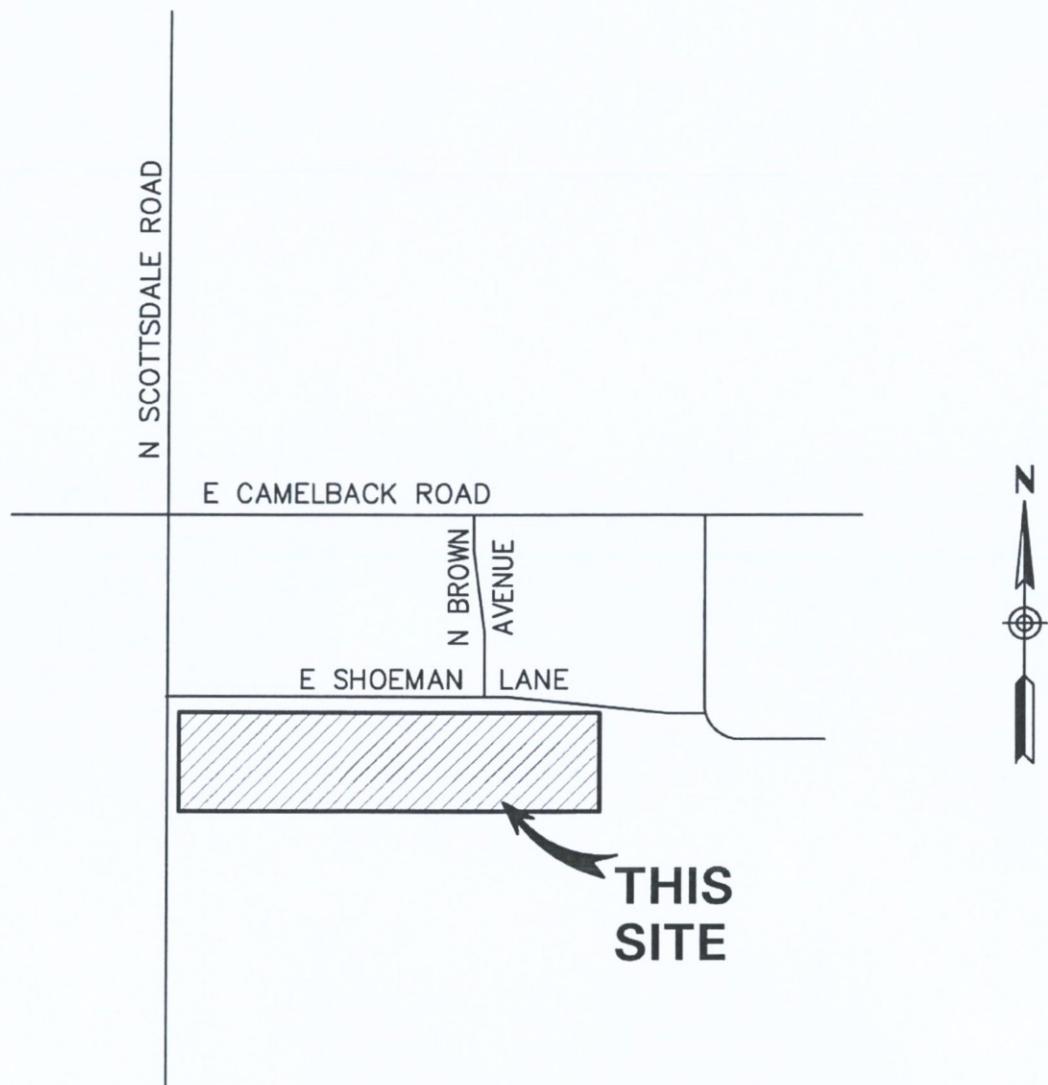
- The existing public water system is adequate to support this development.
- The developer shall be solely responsible for any off-site improvements.

5.0 REFERENCES

- 1) *City of Scottsdale Design Standards & Policies Manual*, January 2010.

APPENDIX A

FIGURES

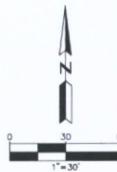


VICINITY MAP
FIGURE 1

CONCEPTUAL UTILITY PLAN FOR SHOEMAN HI-RISE

7235 EAST SHOEMAN LANE
SCOTTSDALE, ARIZONA

A PORTION OF THE SOUTHWEST QUARTER OF SECTION 23, TOWNSHIP 2 NORTH, RANGE 4 EAST, OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA.



| | | |
|--|------|----------|
| NO. | DATE | REVISION |
| 1 | 8/7 | |
| DESIGN BY: LGE DRAWN BY: LGE CHECKED BY: LGE APPROVED CONCEPT REVIEW | | |

VICINITY MAP

DEVELOPER
LGE CORPORATION
10450 N. 74TH STREET, SUITE 200
PHOENIX, ARIZONA 85018
PHONE: (480) 991-4001
FAX: (480) 996-9001
CONTACT: FRANK PETIT

ARCHITECT
LGE CORPORATION
740 N. 52ND STREET, SUITE 200
PHOENIX, ARIZONA 85018
PHONE: (480) 991-4001
FAX: (480) 996-9001
CONTACT: VINCE DALKE

CIVIL ENGINEER
HUNTER ENGINEERING, INC.
10450 N. 74TH STREET, SUITE #200
SCOTTSDALE, ARIZONA 85258
PHONE: (480) 991-3985
FAX: (480) 991-3986
CONTACT: LARRY TALBOTT, P.E.

BENCHMARK
THE INTERSECTION OF CAMELBACK ROAD AND MILLER ROAD, A STONE IN A
HANDHOLE DOWN 14'5" FROM THE GROUND LEVEL ON THE PLAT OF SCOTTSDALE GPS POINT 4234, ELEV = 1259.425, NAVD '88 DATUM.
BASIS OF BEARING
BASIS OF BEARING FOR THIS SURVEY IS A BEARING OF NORTH 89°34'30" WEST, ALONG THE NORTH LINE OF THE SOUTHWEST QUARTER OF SECTION 23, TOWNSHIP 2 NORTH, RANGE 4 EAST OF THE GILA AND SALT RIVER BASE AND MERIDIAN, MARICOPA COUNTY, ARIZONA, ACCORDING TO THE
PLAT OF CAMELBACK PARK PLAZA, AS RECORDED IN BOOK 86, PAGE 13,
MARICOPA COUNTY RECORDS, ARIZONA.

LEGAL DESCRIPTION
PARCEL NO. 2
LOTS 8, 9 AND 10, SHOEMAN TRACT, ACCORDING TO BOOK 42 OF MAPS, PAGE
31, RECORDS OF MARICOPA COUNTY, ARIZONA.

PARCEL NO. 2
LOTS 8, 9 AND 10, SHOEMAN TRACT, ACCORDING TO THE PLAT OF RECORD
IN THE OFFICE OF THE COUNTY RECORDED OF MARICOPA COUNTY, ARIZONA,
IN BOOK 42 OF MAPS, PAGE 31.

**CONCEPTUAL UTILITY PLAN
FOR
SHOEMAN HI-RISE
7235 EAST SHOEMAN LANE
SCOTTSDALE, ARIZONA 85251**

IF YOU ARE GOING TO BUILD
BEFORE YOU DIG
(602) 963-1100
LAW OFFICES OF
TALBOT & TALBOT
MURKIN, MARICOPA COUNTY

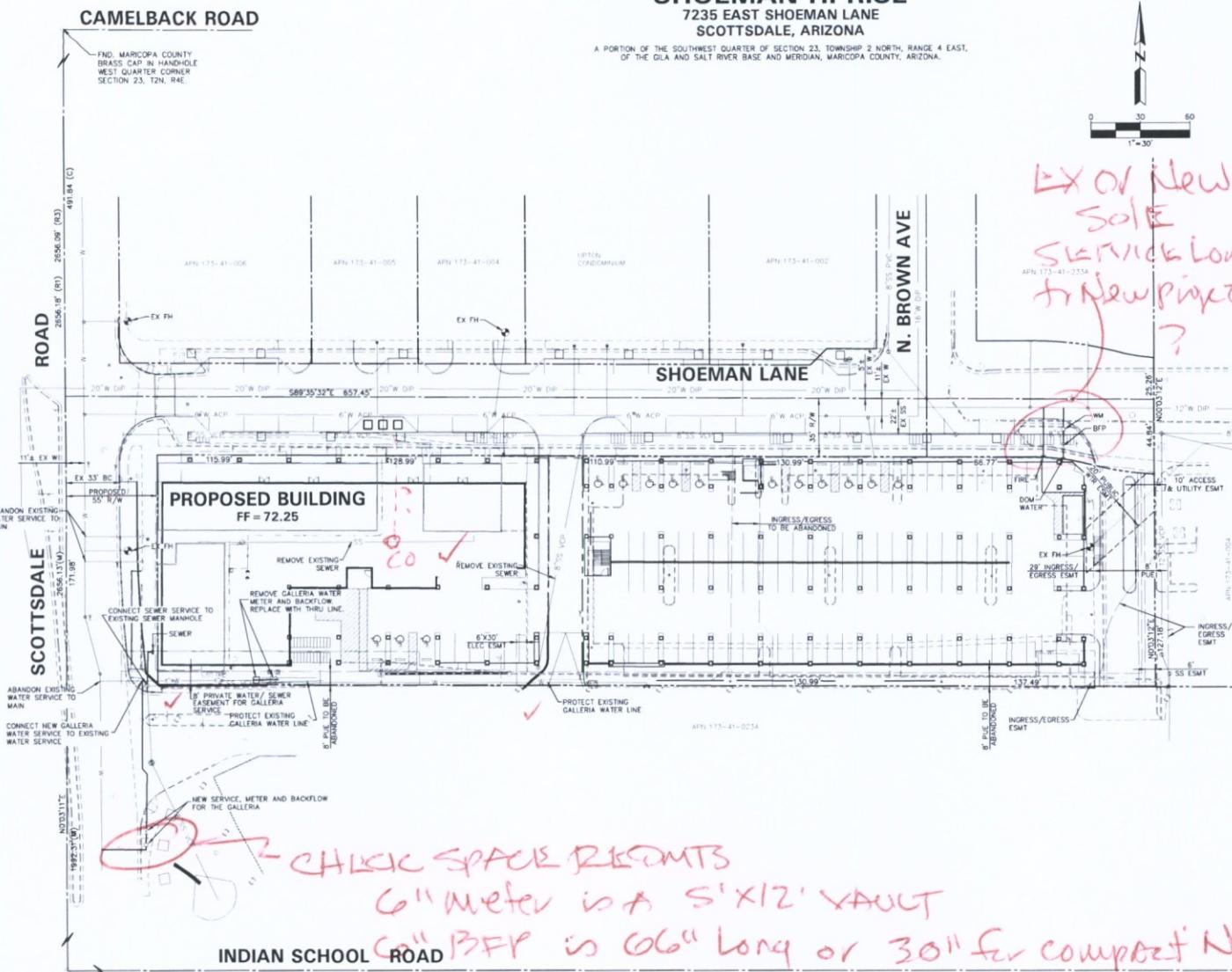
THESE PLANS ARE
NOT APPROVED FOR
CONSTRUCTION
UNTIL THEY HAVE
APPROVED SIGNATURE
FROM THE GOVERNING
MUNICIPALITY

HE JOB NO.:
LGE1C189

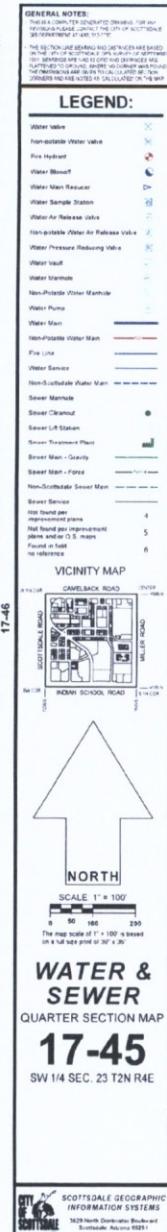
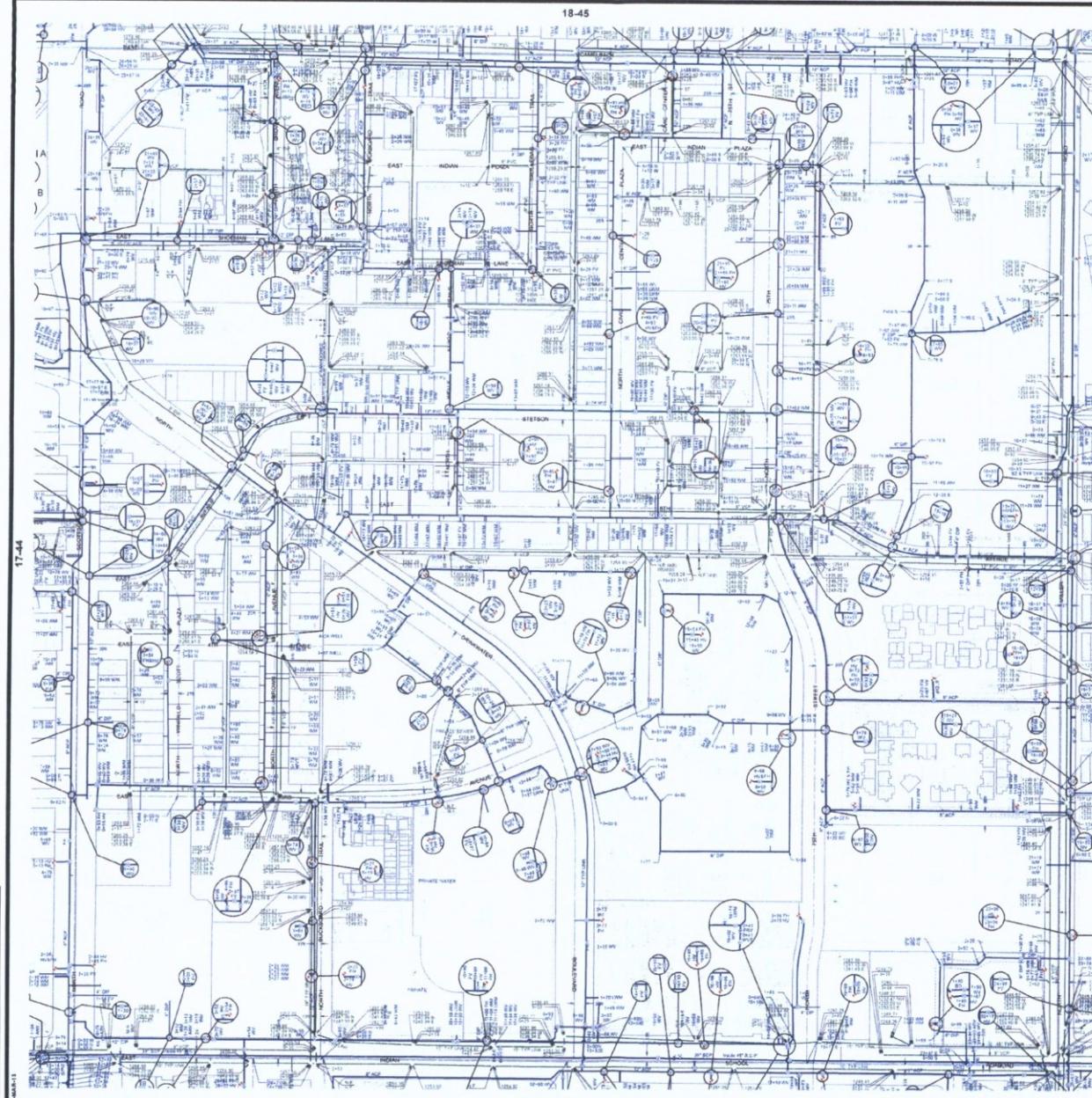
SCALE:
1"=30'

SHEET
C2

EX or New
Sole
Service Line
& New Project
?



NOTICE
THE CITY OF SCOTTSDALE
RECOMMENDS THAT YOU USE A QUALIFIED CONTRACTOR FOR ANY
CONSTRUCTION WORK ON YOUR PROPERTY. THE CITY OF SCOTTSDALE
IS NOT RESPONSIBLE FOR THE WORK OF UNLICENSED CONTRACTORS.



SCOTTSDALE GEOGRAPHIC
INFORMATION SYSTEMS
T2N North Divisional Boulevard
Scottsdale, Arizona 85251

NORTH

SCALE 1" = 100'

0 50 100 200

The map scale of 1" = 100' is based
on a full size print of 30" x 26".

APPENDIX B

CALCULATIONS

HUNTER
ENGINEERING

Project: Shoeman Lane
 Project Number: LGEC189
 City: Scottsdale

PROJECTED MAXIMUM DOMESTIC WATER DEMANDS

| Building Level | Building Use | Building Area (sf) | Average Day Demands (GPD/sf) | Average Day Demands (GPD) | Average Day Demand (GPM) | Max Day Demand (GPM) | Peak Day Demand (GPM) |
|----------------|--------------|--------------------|------------------------------|---------------------------|--------------------------|----------------------|-----------------------|
| Ground Level | Retail | 18,950 | 0.8 | 15,160 | 10.53 | 21.06 | 36.85 |
| Level 2 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 3 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 4 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 5 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 6 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 7 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| Level 8 | Office | 36,480 | 0.6 | 21,888 | 15.20 | 30.40 | 53.20 |
| | | 274,310 | | 168,376 | 116.93 | 233.86 | 409.25 |

Peak Daily Flow Rate = 2 x Average Day

Peak Hour Flow Rate = 3.5 x Average Day

FIRE FLOW SUMMARY

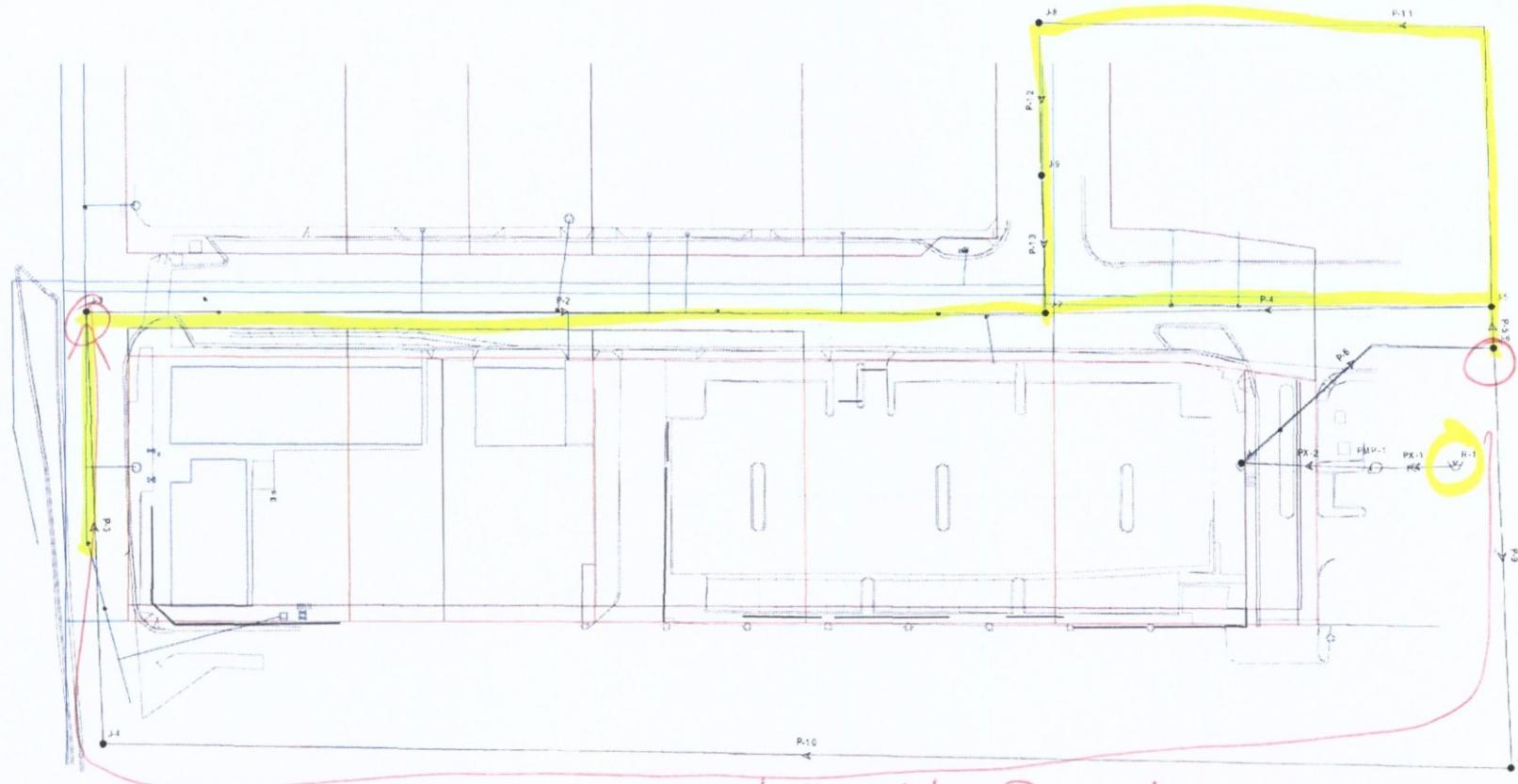
| Proposed Building | Building Area square feet | Model Node | Construction Type | Minimum Required Fire Flow for Buildings Table B105.1 2003 Internation Fire Code | *75% Reduced Fire Flow (gpm) | **Available Fire Flow (gpm) | Sprinkler Reduction Used <i>50%</i> | Building Sprinklered |
|-------------------|---------------------------|------------|-------------------|--|------------------------------|-----------------------------|--|----------------------|
| Multi-Story | 274,310 | N/A | V-B | 8,000 gpm | 2,000 | N/A | YES | YES |

* Reduction Factor requires 1,500 gpm

** Available Fire Flow includes max daily domestic demand (model base flow) at 30 psi residual pressure.

-TS/

Scenario: Fire



Scenario: Peak
Steady State Analysis
Pipe Report

| Label | Length (ft) | Diameter (in) | Material | Hazen-Williams C | Minor Loss Coefficient | Discharge (gpm) | Upstream Structure Hydraulic Grade (ft) | Downstream Structure Hydraulic Grade (ft) | Pressure Pipe Headloss (ft) |
|-------|-------------|---------------|-------------|------------------|------------------------|-----------------|---|---|-----------------------------|
| P-2 | 504.00 | 6.0 | Ductile Iro | 130.0 | 0.00 | -33.14 | 302.64 | 302.71 | 0.07 |
| P-3 | 1,600.00 | 8.0 | Ductile Iro | 130.0 | 0.00 | -33.14 | 302.71 | 302.76 | 0.05 |
| P-4 | 250.00 | 12.0 | Ductile Iro | 130.0 | 0.00 | -345.24 | 302.64 | 302.73 | 0.09 |
| P-5 | 22.00 | 8.0 | Ductile Iro | 130.0 | 0.00 | -376.86 | 302.73 | 302.80 | 0.07 |
| P-6 | 175.00 | 8.0 | Ductile Iro | 130.0 | 0.00 | -410.00 | 302.80 | 303.41 | 0.61 |
| PX-1 | 1.00 | 120.0 | Ductile Iro | 130.0 | 0.00 | 410.00 | 68.50 | 68.50 | 0.00 |
| PX-2 | 1.00 | 120.0 | Ductile Iro | 130.0 | 0.00 | 410.00 | 303.41 | 303.41 | 0.00 |
| P-9 | 750.00 | 8.0 | Ductile Iro | 130.0 | 0.00 | 33.14 | 302.80 | 302.77 | 0.02 |
| P-10 | 1,800.00 | 12.0 | Ductile Iro | 130.0 | 0.00 | -33.14 | 302.76 | 302.77 | 0.01 |
| P-11 | 1,025.00 | 8.0 | Ductile Iro | 130.0 | 0.00 | 31.62 | 302.73 | 302.70 | 0.03 |
| P-12 | 460.00 | 6.0 | Ductile Iro | 130.0 | 0.00 | 31.62 | 302.70 | 302.64 | 0.06 |
| P-13 | 325.00 | 16.0 | Ductile Iro | 130.0 | 0.00 | 31.62 | 302.64 | 302.64 | 0.00 |

**Scenario: Peak
Steady State Analysis
Junction Report**

| Label | Elevation (ft) | Zone | Type | Base Flow (gpm) | Pattern | Demand Calculated (gpm) | Calculated Hydraulic Grade (ft) | Pressure (psi) |
|-------|----------------|------|--------|-----------------|---------|-------------------------|---------------------------------|----------------|
| J-2 | 69.25 | Zone | Demand | 410.00 | Fixed | 410.00 | 302.64 | 100.98 |
| J-3 | 71.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 302.71 | 100.03 |
| J-4 | 63.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 302.76 | 103.52 |
| J-5 | 67.00 | Zone | Demand | 0.00 | Fixed | 0.00 | 302.73 | 101.99 |
| J-6 | 67.00 | Zone | Demand | 0.00 | Fixed | 0.00 | 302.80 | 102.02 |
| J-1 | 68.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 303.41 | 101.63 |
| J-7 | 64.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 302.77 | 103.20 |
| J-8 | 77.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 302.70 | 97.54 |
| J-9 | 73.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 302.64 | 99.25 |

↑ +1200 = cos datum?

Scenario: Fire
Fire Flow Analysis
Fire Flow Report

| Label | Zone | Needed Fire Flow (gpm) | Available Fire Flow (gpm) | Total Flow Needed (gpm) | Total Flow Available (gpm) | Residual Pressure (psi) | Calculated Residual Pressure (psi) | Minimum Zone Junction |
|-------|------|------------------------|---------------------------|-------------------------|----------------------------|-------------------------|------------------------------------|-----------------------|
| J-2 | Zone | 2,000.00 | 2,939.94 | .234.00 | 5,173.94 | 30.00 | 31.71 | J-9 |
| J-3 | Zone | 2,000.00 | 2,196.66 | .000.00 | 2,196.66 | 30.00 | 30.00 | J-4 |
| J-4 | Zone | 2,000.00 | 2,486.64 | .000.00 | 2,486.64 | 30.00 | 30.00 | J-3 |
| J-5 | Zone | 2,000.00 | 3,025.04 | .000.00 | 3,025.04 | 30.00 | 34.71 | J-8 |
| J-6 | Zone | 2,000.00 | 3,141.31 | .000.00 | 3,141.31 | 30.00 | 35.41 | J-8 |
| J-1 | Zone | 2,000.00 | 4,912.87 | .000.00 | 4,912.87 | 30.00 | 40.88 | J-8 |
| J-7 | Zone | 2,000.00 | 2,579.57 | .000.00 | 2,579.57 | 30.00 | 30.00 | J-4 |
| J-8 | Zone | 2,000.00 | 2,360.40 | .000.00 | 2,360.40 | 30.00 | 30.00 | J-9 |
| J-9 | Zone | 2,000.00 | 2,921.61 | .000.00 | 2,921.61 | 30.00 | 30.00 | J-8 |

pls adjust column width

Detailed Report for Pump: PMP-1

Note:

The input data may have been modified since the last calculation was performed.
The calculated results may be outdated.

Scenario Summary

| | |
|------------------------------|------------------------|
| Scenario | Fire |
| Active Topology Alternative | Base-Active Topology |
| Physical Alternative | Base-Physical |
| Demand Alternative | Demand-Fire |
| Initial Settings Alternative | Base-Initial Settings |
| Operational Alternative | Base-Operational |
| Age Alternative | Base-Age Alternative |
| Constituent Alternative | Base-Constituent |
| Trace Alternative | Base-Trace Alternative |
| Fire Flow Alternative | Base-Fire Flow |
| Capital Cost Alternative | Base-Capital Cost |
| Energy Cost Alternative | Base-Energy Cost |
| User Data Alternative | Base-User Data |

Global Adjustments Summary

| | | | |
|--------|--------|-----------|--------|
| Demand | <None> | Roughness | <None> |
|--------|--------|-----------|--------|

Geometric Summary

| | | | |
|-----------|---------------|-----------------|------|
| X | 697,784.18 ft | Upstream Pipe | PX-1 |
| Y | 909,683.28 ft | Downstream Pipe | PX-2 |
| Elevation | 68.50 ft | | |

Pump Definition Summary

| | |
|-----------------|-------------------------|
| Pump Definition | Default Pump Definition |
|-----------------|-------------------------|

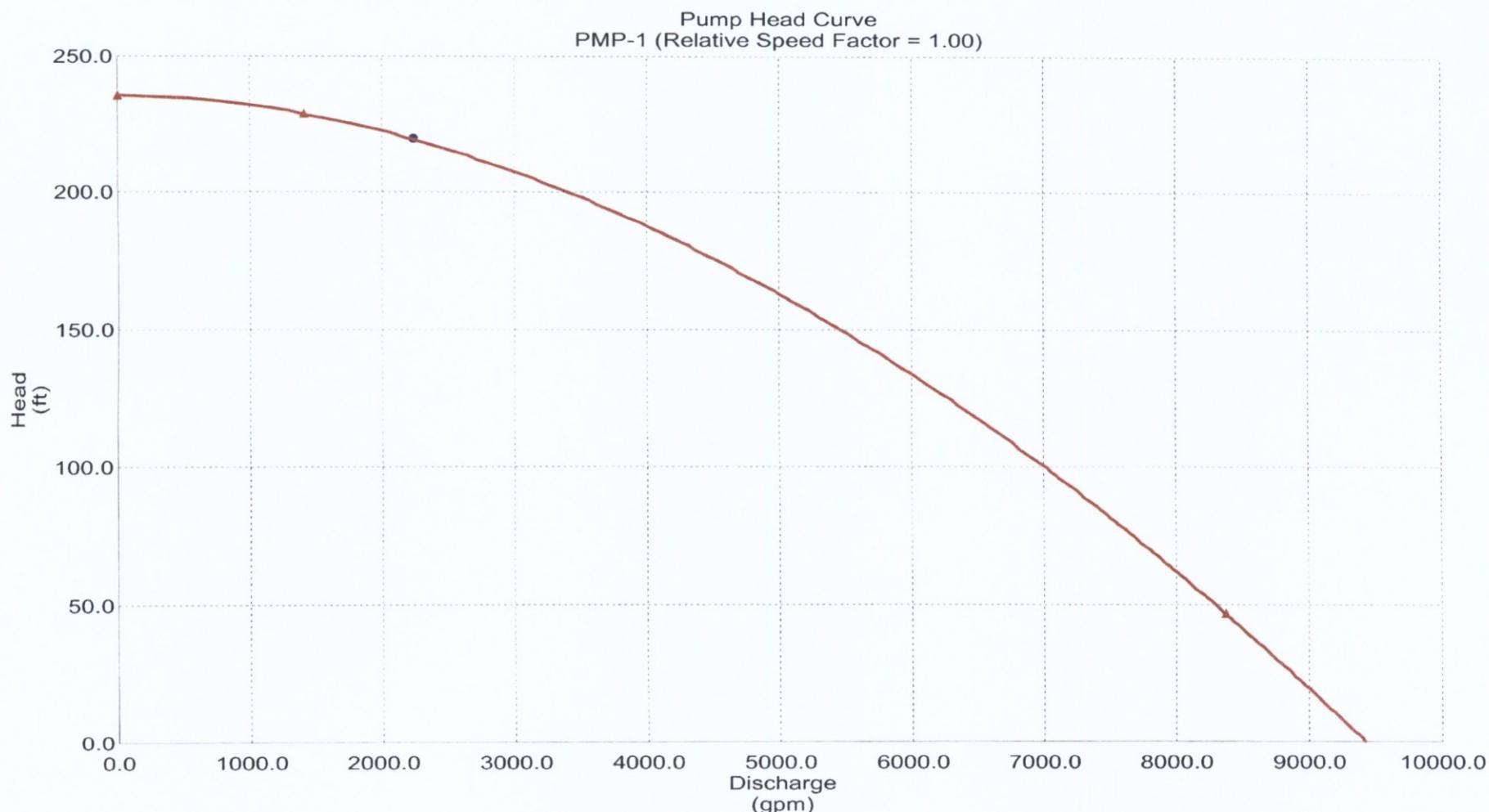
Initial Status

| | | | |
|---------------------|----|-------------------------------|------|
| Initial Pump Status | On | Initial Relative Speed Factor | 1.00 |
|---------------------|----|-------------------------------|------|

Detailed Report for Pump: PMP-1

Calculated Results Summary

| Time Control (hr) | Intake Status | Discharge Pump Grade | Discharge Pump Grade | Pump (gpm) | Head (ft) | Pump Speed | Relative Water Power | Calculated Power (Hp) |
|----------------------|---------------|----------------------|----------------------|------------|-----------|------------|----------------------|-----------------------|
| | | | | | | | | |
| 0.00 | On | 68.50 | 287.74 | 2,234.00 | 19.24 | 1.00 | | 123.66 |



Detailed Report for Reservoir: R-1

Note:

The input data may have been modified since the last calculation was performed.
The calculated results may be outdated.

Scenario Summary

| | |
|------------------------------|------------------------|
| Scenario | Fire |
| Active Topology Alternative | Base-Active Topology |
| Physical Alternative | Base-Physical |
| Demand Alternative | Demand-Fire |
| Initial Settings Alternative | Base-Initial Settings |
| Operational Alternative | Base-Operational |
| Age Alternative | Base-Age Alternative |
| Constituent Alternative | Base-Constituent |
| Trace Alternative | Base-Trace Alternative |
| Fire Flow Alternative | Base-Fire Flow |
| Capital Cost Alternative | Base-Capital Cost |
| Energy Cost Alternative | Base-Energy Cost |
| User Data Alternative | Base-User Data |

Global Adjustments Summary

| | | | |
|--------|--------|-----------|--------|
| Demand | <None> | Roughness | <None> |
|--------|--------|-----------|--------|

Geometric Summary

| | | | |
|---|---------------|-----------|----------|
| X | 697,825.85 ft | Elevation | 68.50 ft |
| Y | 909,684.54 ft | Zone | Zone |

Calculated Results Summary

| Time (hr) | Calculated Hydraulic Grade (ft) | Inflow (gpm) | Outflow (gpm) |
|--------------|---------------------------------------|-----------------|------------------|
| 0.00 | 68.50 | 2,234.00 | .234.00 |

Scenario: Model Test 1
Steady State Analysis
Junction Report

| Label | Elevation (ft) | Zone | Type | Base Flow (gpm) | Pattern | Demand Calculated (gpm) | Calculated Hydraulic Grade (ft) | Pressure (psi) |
|-------|----------------|------|--------|-----------------|---------|-------------------------|---------------------------------|----------------|
| J-2 | 69.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 101.62 |
| J-3 | 71.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 100.64 |
| J-4 | 63.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 104.10 |
| J-5 | 67.00 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 102.59 |
| J-6 | 67.00 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 102.59 |
| J-1 | 68.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 101.94 |
| J-7 | 64.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 103.78 |
| J-8 | 77.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 98.16 |
| J-9 | 73.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 304.12 | 99.89 |

~ 102 psi MATCHES flow TEST

Scenario: Model Test 2
Steady State Analysis
Junction Report

| Label | Elevation (ft) | Zone | Type | Base Flow (gpm) | Pattern | Demand Calculated (gpm) | Calculated Hydraulic Grade (ft) | Pressure (psi) |
|-------|----------------|------|--------|-----------------|---------|-------------------------|---------------------------------|----------------|
| J-2 | 69.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 297.19 | 98.62 |
| J-3 | 71.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 297.19 | 97.65 |
| J-4 | 63.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 297.19 | 101.11 |
| J-5 | 67.00 | Zone | Demand | 0.00 | Fixed | 0.00 | 297.19 | 99.59 |
| J-6 | 67.00 | Zone | Demand | 0.00 | Fixed | 0.00 | 297.19 | 99.59 |
| J-1 | 68.50 | Zone | Demand | 1,404.00 | Fixed | 1,404.00 | 297.19 | 98.94 |
| J-7 | 64.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 297.19 | 100.78 |
| J-8 | 77.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 297.19 | 95.16 |
| J-9 | 73.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 297.19 | 96.89 |

~ 0.99 psi - indicates flow Test

Scenario: Model Test 3
Steady State Analysis
Junction Report

| Label | Elevation (ft) | Zone | Type | Base Flow (gpm) | Pattern | Demand Calculated (gpm) | Calculated Hydraulic Grade (ft) | Pressure (psi) |
|-------|----------------|------|--------|-----------------|---------|-------------------------|---------------------------------|----------------|
| J-2 | 69.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 114.70 | 19.66 |
| J-3 | 71.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 114.70 | 18.69 |
| J-4 | 63.50 | Zone | Demand | 0.00 | Fixed | 0.00 | 114.70 | 22.15 |
| J-5 | 67.00 | Zone | Demand | 0.00 | Fixed | 0.00 | 114.70 | 20.64 |
| J-6 | 67.00 | Zone | Demand | 0.00 | Fixed | 0.00 | 114.70 | 20.64 |
| J-1 | 68.50 | Zone | Demand | 8,378.00 | Fixed | 8,378.00 | 114.70 | 19.99 |
| J-7 | 64.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 114.70 | 21.83 |
| J-8 | 77.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 114.70 | 16.20 |
| J-9 | 73.25 | Zone | Demand | 0.00 | Fixed | 0.00 | 114.70 | 17.93 |

~ 70^o psi - MATCHES flow Test



ALLIANCE FIRE PROTECTION CO.

Phone: (480) 966-9178 Fax: (480) 967-9191
2114 East Cedar Street • Tempe, Arizona 85281

E-mail Address: afpc@afpc.com

AZ Lic. C-16 58130
AZ Lic. L-16 74007
NV Lic. C-41a 30135

FIRE HYDRANT FLOW TEST

Name: Shoeman Lane Building

Date: 07/10/15

Scottsdale Rd & Shoeman Lane

Time: 7:30 AM

Scottsdale, AZ

Report #

Tech: Gus Piombi

Static Hydrant: _____ Flowing Hydrant: _____

Elevation: 0

Elevation: 0

Dist. Between Hydrants: 400 ft

Type of Supply: City Main

Diameter of Main:

Static Pressure: 102.0

HGL 1273

Residual Pressure: 99.0

HGL 1508 stat

Pump Present: NO

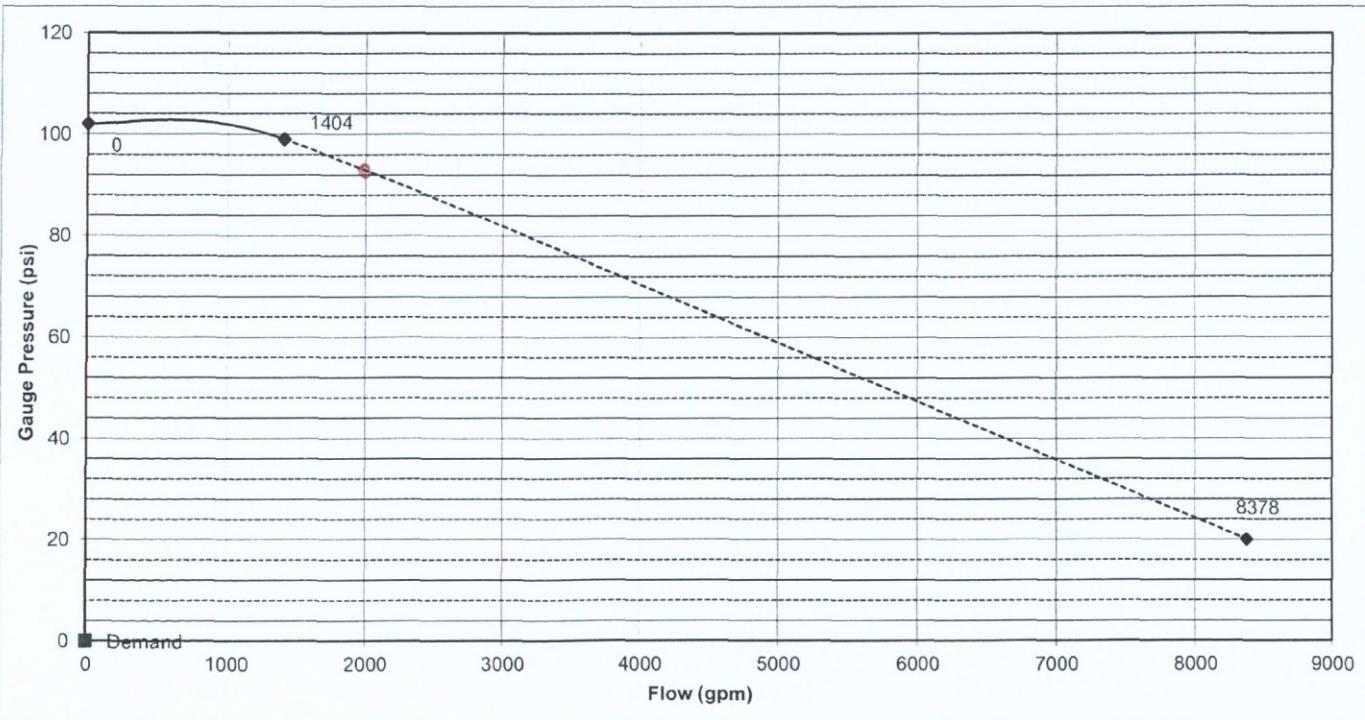
Tank Present: NO

Req. GPM: _____

Req. PSI: _____

| Hydrant: | 1 | 2 | 3 | 4 |
|------------------|-------|---|---|---|
| Outlet Diameter: | 2.5 | | | |
| Pitot Reading: | 70.0 | | | |
| Coeff: | 0.900 | | | |
| Discharge GPM: | 1404 | 0 | 0 | 0 |

| | | | | | |
|----------------------|-----|-----|---|------|-----|
| Static pressure of | 102 | psi | @ | 0 | gpm |
| Residual pressure of | 99 | psi | @ | 1404 | gpm |
| Available flow @ | 20 | psi | @ | 8378 | gpm |



Comments: _____

NOTES:

1. Flowing hydrant is assumed to be on a circulating main or downstream of the pressure test hydrant on a dead-end system.
2. Flow analysis assumes a gravity flow system with no distribution pumps and having no demand, other than the test
3. The distance between hydrants, elevations & main diameters are for information only.



N Scottsdale Rd & E Shoeman Ln

Traffic, Transit, Bicycling

Imagery ©2015 Google, Map data ©2015 Google 50 ft

Both hydrants OFF 6" system
w/ interconnect @ Brown to 20" pipe.